

Antiquity

VOL. XX No. 79

SEPTEMBER 1946

Hoshi-No-Tama

by W. H. RIDDELL

MANI, the Sacred Jewel (Shansi in Chinese; Shinshi in Japanese) is that one of the *Sapta Rapta* (Seven Treasures) which is the emblematic symbol of the Buddha and his doctrine. Defined as a supernatural pearl, spherical, self-luminous, and of unfading lustre, it sheds a brilliant light on all its surroundings and is therefore an appropriate simile for the Enlightenment which Buddhists seek. In the Iconography of the Far East this fabulous gem is an attribute of several persons in the Buddhist hierarchy; the principal one being K'shitigarbha (Chin: Ti Sang, Jap: Jizo Bosatsu) who is the Bodhisattva of Compassionate Help in the same way that Avalokitesvara (Chin: Kwanyin, Jap: Kwannon) is the Bodhisattva of Mercy. The latter may at times be shown as a holder of the Jewel—see for an example, the well-known Yumadono Kwannon of Horiuji (1)—but more often her chosen attribute is a slender vase. One of the sixteen Arhats (Chin: Lohan, Jap: Rakan) is also represented holding the Sacred Jewel in his hand. This is Panthaka, the tenth on the list, whose constant companion is a Dragon—the divinely appointed guardian of the Gem. Sometimes a Dragon alone holds the Gem in his claw: sometimes the Gem appears in solitary splendour with two Dragons in the role of heraldic supporters on either side. The illusion that they are fighting for it (like the Lion and Unicorn) is due to the querulous expression Dragons habitually wear, and not necessarily to rivalry.

The above are by no means the only appearances of the Sacred Jewel. It is a constant attribute of Kichijoten, the richly garbed and pleasant-faced Goddess of Happiness, who has been identified rather vaguely with the Hindoo S'ri Devi, which is a title—as who should say 'Her Sacred Majesty'—rather than a name. More particularly she is identified with Sarasvati (Jap: Bentei), the wife of Brahma and sister of Vaisramana (Jap: Bishamonten) one of the twelve Deva Kings. Others identify her with Lakshmi, the Brahmanic Goddess of Love who, like Aphrodite, was born from a divine disturbance in the ocean's foam.

¹ This is perhaps the most precious relic of early Buddhist sculpture in Japan. It dates from the 6th century A.D. and its sculptor was probably a Korean artist resident in Japan. Though now always referred to as a Kwannon the ascription seems to be an arbitrary one. For centuries it was kept in the Yumadono as a 'hidden Buddha' too sacred to be looked upon; and Professor Fenellosa in his *Epochs of Chinese and Japanese Art* (1913) gives an eloquent and exciting description of its unwrapping in his presence in 1884. The figure, which is of wood, gilded and in almost perfect preservation, holds between the fingers of both hands a small stand upon which reposes a sphere—the Mani. Its aura of flame, like the figure's elaborate crown, is of gilded bronze.

In Japan the Sacred Jewel is generally spoken of as the Hoshi-no-Tama (2) (Tama=jewel) and is only referred to as the Shinshi (literally sacred or divine seal) when, with the Mirror and the Sword, it makes one of the three components of the Japanese Imperial Regalia. Through Buddhist influence the Shinshi was substituted for the earlier Magatama—comma-shaped jewels pierced for stringing, which may be reminiscent of a yet earlier necklace of boars' tusks or bears' claws worn by some prehistoric Japanese chieftain. (3). It is perhaps because the Shinshi was part of the Imperial insignia, that the Hoshi-no-Tama occurs more frequently in Japanese art than in the art of other Buddhist countries. It becomes closely associated with the universally popular Seven Gods of Good Luck—the Shichi-fuku-jin—in particular with Daikoku, Hotei, Bishamonten and Bentei, of whom the last two have already been mentioned in a loftier role. Moreover the Hoshi-no-Tama is one of the Takaramono—the ten precious things (4)—carried as cargo on board the treasure-ship, Takarabune, which the Gods of Good Luck traditionally sail to Japan every New Year's day.

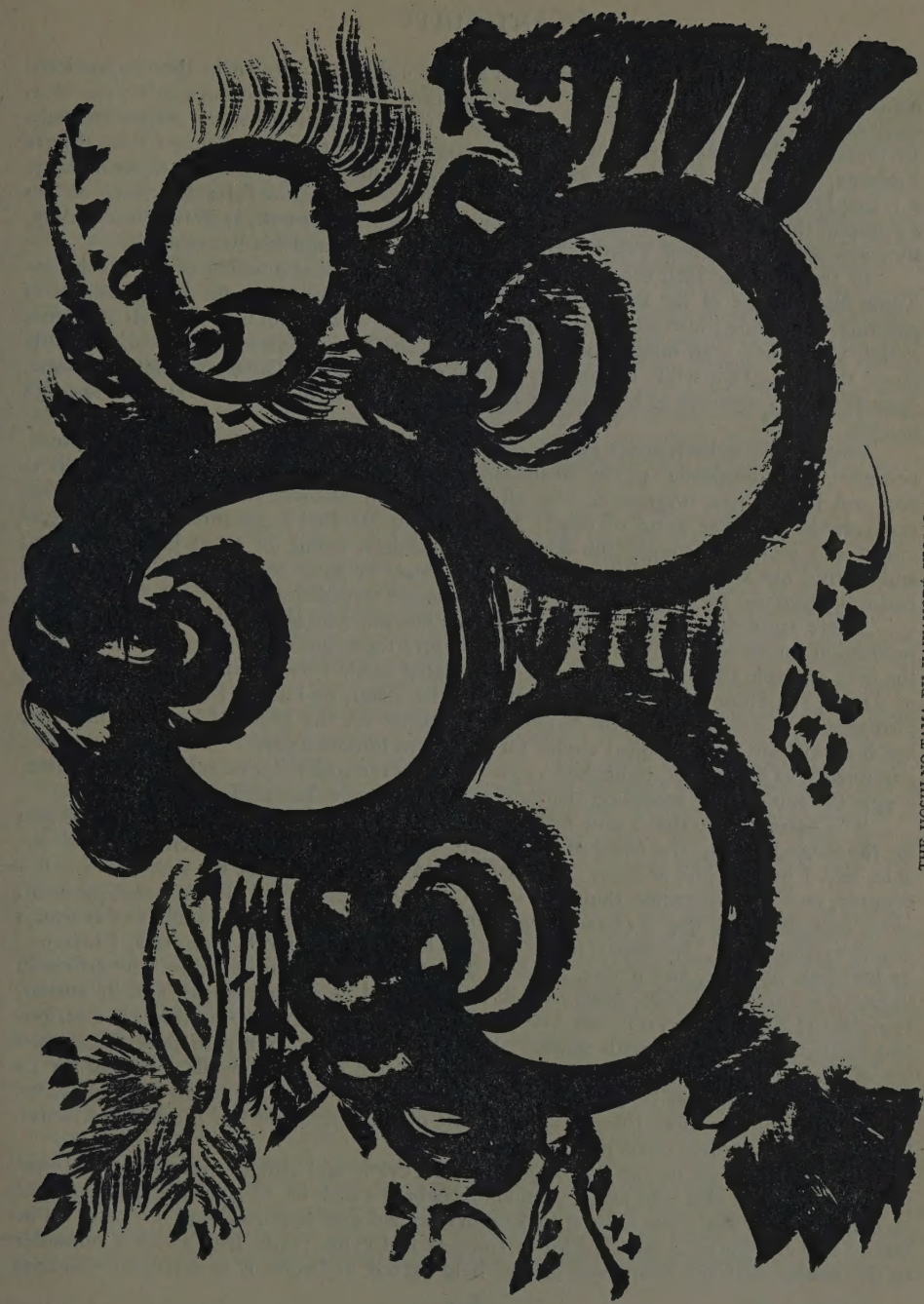
In early art the Sacred Jewel is depicted as a spherical ball, often with an aura of flame. In colour it is either green (jade), red (flame-tinted), or translucent like crystal. An example will be found in the fine 8th century painting of Kichijoten (one of the very earliest surviving paintings in Japan) reproduced in colour in an early Kokka magazine and more recently in Mr H. Minamoto's *Illustrated History of Japanese Art*, 1935. It will be found also in the 13th century painting of Jizo Bosatsu exquisitely reproduced in colour in *L'Histoire Generale de l'Art de Japon*, Paris 1900; and in the Tang painting of a Bodhisattva (probably Ti Sang) in the Catalogue of Liang Chang Chu's Collection published in 1919 (5).

² Though an odd confession for a writer to make, I am not at all sure how to spell the title of this paper. The word 'Hoshi' is the crux. Dr William Anderson gives 'Hoju' as the reading and Mr Arthur Morrison follows him. Both were leading authorities on Japanese Art in their day, and entitled to respect. On the other hand Mr Josiah Conder, author of a book on the Art of Kiosai, gives the word as 'Hoshi'. He is something more than an authority, he is an expert, having worked as a pupil for two years in Kiosai's studio. Kiosai must often have used the word and probably gave Mr Conder the thing itself to draw. I have therefore preferred his reading. The word is not to be found, either as Hoshi or Hoju, in Hepburn's Japanese Dictionary: hence my doubt. It is possible both readings are correct; the Japanese language abounding in alternative readings of its borrowed Chinese ideographs. Almost all have at least three.

³ Although Buddhist influence was sufficiently strong in early days at the Japanese Court to substitute the Shinshi for the earlier Magatama it appears that since the Restoration of 1868 and the subsequent revival during the Meiji era (1868-1912), of pure Shinto uncontaminated by Buddhist intrusions, the Magatama have been resubstituted for the Shinshi and that now three of the former, coloured respectively red, white and blue, constitute the third item of the Imperial regalia. See the article by Mr Goji Akita in the Japan Society's Transactions, vol. VI, 1901-2.

⁴ The ten precious things (takaramono) are the Sacred Jewel, the inexhaustible purse, the hat of invisibility, the flying straw rain-coat, the scrolls, the clove, the hammer, the weight, the key, and the shippo (some kind of coin). In our illustration the shippo and the clove are in the immediate foreground, the hammer at the back (right, where there is also a suggestion of the straw rain-coat). The other takaramono are not visible. The drawing though strong and self-confident is clearly student work. Kiosai was to do better than this in later years.

⁵ This Catalogue was compiled by the Chinese owner of the collection in 1837. It was not published until 1919, when it appeared with photographic reproductions somewhat mysteriously and with no explanations (though translated into English) by the Chinese publisher. The present whereabouts of the collection appears to be unknown. The picture referred to in the text is unquestionably a Tang painting or a faithful copy of one. It closely resembles some of those brought back from Central Asia by Sir Aurel Stein.



THE HOSHI-NO-TAMA BY KAWANOBE KIOSAI (1831-89)

In later times the Hoshi-no-Tama is almost universally drawn in the conventional manner shown in our illustration. The beginning of this convention can be found as early as the 11th century. We see the basis of it in the painting of the Arhat Panthaka attributed to the great Chinese master Li Kung Lin (Lung mien) of Sung (*Toyo Bijutsu Taikwan*, 1908, vol. 8, ff.) and also in a Japanese embroidery (tempo Emperor Sanjo d. : 1017) reproduced in the above mentioned *Histoire Generale de l'Art de Japon*. When a group of three Sacred Jewels appear in a pyramidal arrangement, as in this embroidery, they symbolise the Great Triad—The Buddha, his Law, and his Priesthood.

In Japan of the 17th century and later this conventional drawing of the Hoshi-no-Tama became one of the first stock exercises given to a pupil in the Kano schools of painting : and our illustration is actually an example of such an exercise. It is from a sketch-book filled with miscellaneous copies and studies by Kawanabe Kiosai, probably about the year 1850, while he was a youthful pupil in Kano Tohaku's studio. Kiosai, born 1831, was destined to become the last great painter of old Japan. He died aged 58 in 1889.

What I have written above gives—but in barest outline only—the status, appearance, pedigree, and significance of the Hoshi-no-Tama ; and what I now propose to do is to seek out how it first originated. So all pervasive an emblem as this does not spring ready-made from the mind of man. Some strong external suggestion from an actual object and incident brought the Hoshi-no-Tama into being, or so at least I believe ; and to find out what that object and incident was, we must venture into the realm of Natural History—an undertaking I view with some trepidation.

There are a few nature-stories, quite true stories, which a Zoologist, careful of his reputation for veracity, shrinks from telling before those not of his persuasion. Perhaps the best example concerns the intimate liaison that exists between that small brown bird of Africa, the Honey-Guide (Indicator), and the Ratel, or Honey Badger, wherein the bird acts as investigator and the badger as executive for the profit of both. This story has been current in Zoological circles for some two hundred years—the curious can find it in Bewick's *Quadrupeds*, published 1790—and yet even today if it be told among laymen, it gets the same chilly reception that commonly greets the last fishing-story but one.

The nature-story that I now have to tell—the story which suggests a possible origin for the Sacred Jewel—the Mani of Buddhism—is less widely known, even more improbable, and I believe just as true. It has been current in the West for more than half a century, and yet, interested though I am in all things zoological, I never ran across it, until, only the other day, I chanced upon it in, of all places, a back number of *Harper's Monthly Magazine*. Its appearance there, as long ago as March 1890, was, I imagine, its first bow in print, and it was, as far as I can make out, also its last. The article in question is called *The Naja-kallu* (which today would be spelled Naga), and its author, Professor H. Hensholdt, PH.D.—an American of German extraction—is evidently a serious and responsible scientist with neither the predilection nor ability to pull the august leg of *Harper's* editor—at that date the novelist, Mr W. D. Howells. Except for its more important passages Dr Hensholdt's narrative cannot here be given in his own words. Space will admit no more than a rapid résumé of the greater part of it ; but it will lose little by being stripped of its padding.

In 1876, he tells us, he was travelling in Ceylon and almost everywhere he went planters whom he met told him a yarn about cobras which he, as a scientist, stigmatized as ' the strangest and most absurd snake-story he had ever heard or read '. Later on he was to find this story as well-known in India as in Ceylon : and here (with a reminder to the reader that the cobra was always held sacred in India) it is verbatim. ' Some

cobras—perhaps one in twenty—are in possession of a precious stone which shines in the dark. This stone the snake is in the habit of carrying about in its mouth, regarding it as a treasure which it carefully preserves with its life. At night the cobra deposits the stone in the grass and watches it fascinated for hours. But woe to him who then approaches ; for the cobra is never more dangerous than when occupied in this manner’.

The Professor, as I say, does not believe a word of this ; dismisses it from his mind ; and goes off to stay with a compatriot, Mr J. Warkus, one of the few German settlers then in Ceylon. Before he had been in the house a day Mr Warkus tells him the snake-story ; so does Mrs Warkus ; and so do all the little Warkuses—quite intelligent children the Professor says ; his complacency by this time a little shaken. He starts asking questions. His host tells him that he has seen at least forty cobras with these stones. Killing cobras was his hobby and he averaged ten to twenty a day. He had no cobra-stone just then ; but he could get one without much difficulty. It was merely necessary to be careful. One had to kill the cobra outright—no easy matter in the dark ; and if bungled, the snake was certain to get away with the stone. The old man added that according to the natives, a cobra, deprived of its stone, either died of grief or else committed suicide—a statement which reawakened the Professor’s earlier doubts and also—an incident of rare occurrence—made him laugh.

He was, however, sufficiently interested to offer a five-rupee reward to any native who could guide him to a cobra keeping its strange vigil. In the meantime he started killing cobras for himself. In four days he killed at least fifty, but not one of them had a stone. On the fifth day a Tamil coolie came to say that he had located a kallunaga’s (stone-cobra’s) nightly haunt ; and that night he led the Professor through the jungle to a place where an immense Tamarind tree presided over the water-fall of a small stream. The boy refused to approach the tree nearer than fifty yards. The intrepid Professor therefor crept forward alone until he saw a sight that brought him up all standing. At the foot of the tree he could dimly make out the coils and erect head of a cobra in front of which a point of light shone with a steady glow. He had brought no gun, but he was all for killing the snake at once. The timid coolie implored him not to try. Again and again he assured the Professor that he could get the stone for him the following night ; and ultimately with that assurance the Professor had to rest content. Stimulated by a promise of five more rupees the boy kept his word. The next day but one he brought to Dr Hensholdt the much desired cobra-stone, or at any rate a luminous pebble of some kind.

The description of this interesting object I will give in the Professor’s own words :—
‘ It was a semi-transparent, water-worn pebble of yellowish colour, about the size of a small pea, which in the dark, especially when previously warmed, emitted a greenish phosphorescent light. At first I believed it to be sulphate of barytes or “ heavy spar ”, several varieties of which, especially that found near Bologna (*Bolognese spar*) are known to phosphoresce strongly when heated over charcoal. But I ultimately found it to be *chlorophane*, a rare variety of fluorspar. If a piece of this latter mineral be warmed over a spirit lamp, or dropped into a glass of hot water, it will shine with a beautiful green colour as long as the heat continues : but some varieties are so sensitive that even a slight warming (such as is produced by holding the specimen in the hand for a few moments) will cause them to phosphoresce for hours in the dark. Gustave Rose, the eminent Berlin mineralogist, relates that, on one occasion, when travelling with Ehrenburg and Humboldt to the Altai mountains, he found in the gravel of the Irtisk, near Krasnojarsk, chlorophane pebbles which shone with intense brilliance all night long without having received any other warming than that of the sun’s rays during the day’.

Now apart from anything else, it is inconceivable that the man who wrote that passage was writing with his tongue in his cheek. Dr Hensholdt is no second Defoe; he is obviously a man relating a curious experience as clearly and truthfully as he can.

In the acquisition of the stone the Tamil boy had shown some ingenuity. In the evening he climbed the big Tamarind with a bagful of ashes on his back: and when, that night, the cobra reappeared and deposited its stone in the grass, he promptly smothered the latter in a cataract of ash. The distraught cobra, unable to find its treasure, finally went away, but not until next morning did the boy descend to rake out the stone. His motto was 'Safety First'.

Dr Hensholdt goes on to say that before he left Ceylon he got three more cobra-stones; and his explanation of their real importance to a cobra is convincing and almost certainly the right one. Needless to say the cobra's object was not adoration; it was something much more material. The Professor had noticed that the jungle swarmed with fireflies (*Lampyris noctiluca*), and that the cobra-stone shone with the same faintly greenish light as that emitted by the wingless female of this species. But it shone with a steady glow, whereas the light of a female *Lampyris* is intermittent, waxing and waning at regular intervals. In spite of this discrepancy the glow of the pebble undoubtedly acted as a lure for the male fireflies: and it is possible that they found in such a 'constant' female 'metal more attractive'.

Cobras, unlike most snakes, eat insects. A firefly is to a cobra what an oyster is to an alderman. But the male firefly is less static than an oyster. Under normal conditions a cobra has to go in energetic and exhausting pursuit of them. Not so, if he is the proud owner of a cobra-stone. The fireflies come to him as the oysters did to the Walrus and the Carpenter, and without moving a yard he enjoys a feast of Colchester dimensions.

One question inevitably arises:—How does the cobra work out the somewhat elaborate sequence of his actions. In the first place how does he discover that these luminous chlorophane pebbles attract fireflies, and afterwards, what prompts him to get such a pebble from the river bed gravels where they are found and carry it to the jungle where fireflies resort. A deliberate exercise of intelligence seems to be the only answer. If every cobra in the district used a luminous pebble as a lure we might attribute the habit, though localized, to inherited instinct. But this solution will not work. Only a small percentage of cobras—less apparently than the aforesaid one in twenty—owned and used this lure. Presumably also there were many more cobras than there were pebbles available. The use of the few pebbles there were could not build itself into a heritable habit among all the cobras of the district, unless there were more than enough pebbles to go round.

Man (*homo sapiens*) is the only tool-using animal. It is the one characteristic that distinguishes him from the lower orders of creation. No chance need induces any other living creature (with the possible exception of some of the primates) to use a tool other than those that grow on, and are part of, their own bodies. The cobra-stone is as much a tool as is a trap to catch mice. So for that matter is the nest of a bird a tool to aid it in the hatching of its young. But all birds of the same species automatically build the same kind of nest. We may fairly attribute their action to inherited instinct, just such an inherited instinct as enables ourselves, unconsciously and outside the control of our will, to keep our hearts beating and to digest our food. What makes the deliberate use by a cobra of a luminous lure the astonishing thing it is, is that only a few cobras so use it . . . not the whole poisonous crowd of them. I have run across only one other example of this casual use of an external tool by one of the lower orders. Dr Malcolm Burr tells the

story in his fascinating *Insect Legion*. Two American entomologists Mr G. W. and E. G. Peckham were watching a sand-wasp (*Ammophila*) filling in her burrow after she had laid her egg in it and stocked it with living but paralysed caterpillars for her young to eat when hatched. While so employed they saw her pick up a tiny pebble and deliberately use it as a hammer. This was an exceptional incident. Possibly not more than one in a thousand sand-wasps would so use any chance pebble lying around. Hence their very intelligible astonishment. Later, another entomologist, Dr Williston, told them that he had also witnessed a similar incident, but that for fear of ridicule he had not dared to publish his observations. Dr Burr then asks the trenchant question—'Can insects (and we might add snakes) learn by experience'? Fortunately we are not called upon to answer that question here.

From a strictly scientific point of view there is a slight but serious flaw in Dr Hensholdt's narrative of the *Naga-kallu*. It appears from his story that he himself never actually witnessed the taking of one from a cobra. On the only occasion he mentions seeing a cobra with a stone it was night-time and he failed to secure the stone. The coolie brought it, or some luminous stone, two days later. We cannot be quite certain therefore that the glowing point of light the Professor saw was in fact the cobra-stone he afterwards secured. It might have been a female firefly glowing aberrantly with a constant instead of an intermittent light. It is extremely improbable it was so; but the element of doubt is there, barring the way to assured proof.

But even if there were error here it would not affect our present inquiry. My object in retelling Dr Hensholdt's narrative is, of course, to support the proposition that the *Naga-kallu*—the self luminous pebble—is the *fons et origo* of the Sacred Jewel, the Mani, which as the reader will remember is defined as shining with a light of its own and illuminating all within reach. For us the most important fact in the Professor's narrative (and in this respect we can unreservedly believe him) is that the story (true or not) of cobras which adore a luminous stone, carry it about with them, and defend it with their lives, is one often told and commonly believed by the natives of India and Ceylon. In India whatever a cobra does is significant, for the cobra is universally regarded as sacred. Among primitive folk serpent-worship is almost as wide as the world and has an unusual gift of persistence: though why innumerable Hindoos should consider sacred the abominable ophidian which annually destroys some five thousand of their fellows is yet one more of the insoluble enigmas of the East.

Buddhism travelled to China from India and thence, by way of Korea, to Japan. What more likely than that the Buddhist missionaries who brought it should bring with them also, as a parable of their Faith, the story of the Cobra's adoration for a luminous Jewel. But as there are no cobras in China their parable would there lose something of its point. The substitution of dragon for cobra was an easy and obvious method of regaining for it all and more of its original appeal. For in China, as everybody knows, the dragon, like Habbakuk, is '*capable de tout*'. In medieval Europe a far-flung echo of this Indian snake story may be the foundation of the once popular fallacy which Shakespeare did so much to perpetuate when he gave to the Exiled Duke in 'As You Like It' his set speech about adversity:—'which like the Toad, ugly and venomous, wears yet a precious Jewel in his head'. Prettily put, of course, but a libel on a harmless and useful reptile.

Meanwhile we have evidence that the original Indian association of a snake with the Sacred Jewel—Mani—was carried to Thibet by Buddhist teachers at an early date and there survived unchanged. In the fourth and last volume of René Grousset's *Civilizations of the East* (Hamish Hamilton, 1934) the author reproduces (fig. 183) part of a

Thibetan banner which belongs to the Musée Guimet. It depicts Subhati protecting Nagas (snakes) against the attacks of Garudas—amusing, but unfortunately mythical, birds which resemble predatory parrots. On the right of the picture three snakes emerge from a troubled sea to defend their *Manis* from the attack of a Garuda. Though half buried in foam these Sacred Jewels are readily recognizable as such, by the conventional spirals on their tops.

Most of the incidents depicted on Thibetan banners are based on long-lost Bengali originals of the Pala and Sena periods (8th–12th centuries A.D.) or else upon Nepalese originals of a somewhat later date. Once these subjects had become wholly Thibetanized in treatment, it was the pious practise of Thibetan artist-lamas to repeat them rigorously without the alteration of a line. Accurate dating of these banners is in consequence as difficult as it is unessential from an iconographic point of view. The banner referred to above was probably standardized from a Bengali original in medieval times and both subject and treatment date from that period without the least essential change, although the banner itself may be no older than the 18th century. Its importance to us is that it gives us the assurance that the snake, not the dragon, was the original guardian of the Jewel, and had been so considered in India for a very long time.

It is nevertheless a surprise to find that, further East than Thibet and in spite of the satisfactory substitution of dragon for cobra, the older original managed to survive even so far afield as Japan. A Kakemono in the British Museum (No. 78) by Taira Soin, which purports to be a copy of a picture by the 'Father of Japanese Painting' Kōsō no Kanaoka (9th century A.D.) (6) affords us interesting evidence of this. It shows us Bente—the Indian Sarasvati (or Lakshmi?) holding in one hand a sword and in the other the Sacred Jewel. Her body to the waist is that of a woman: from the waist down she is a snake.

There may however be some different and darker reason for this. Mr W. G. Aston in his translation of the 'Nihongi' notes that there is strong, though concealed, evidence in that apochryphal 'Chronicle of Japan' of both serpent and phallic worship in ancient days. Since the quite recent revival of pure Shinto, the renewed interest in the Shinto scriptures, of which the Nihongi and Kojiki are chief, and in the ancient manners and customs therein set forth, it is not altogether unlikely that both these cults, and especially the latter, have reawakened (if indeed they ever slept) to a new and terrible activity, unsuspected by the West, among the people of every rank and profession in Japan. Certainly the behaviour of the Japanese during the recent War, so unlike their behaviour in the Russian War of 1904–5, indicates some authoritative and ritual condonation, and even encouragement, of ancient savagery and of sensual indulgences of the baser sort. Let those, who wish to know the concomitant horrors of a phallic cult carried to extremes, read in the Nihongi the reign of the Emperor Muretsu (A.D. 499–506) and observe how it is told there with hardly a word of disapproval or disgust. If there is anything in the doctrine of metempsychosis, the unquiet and unclean ghosts of Muretsu and his like must have inspired and guided the minds of many a sadistic soldier serving in the Japanese army of yesterday: but today, let us hope, tidily removed to a sphere where their unnatural proclivities will be better appreciated. Loyal though they were and brave to the *nth* degree, docile to their commanders and very cheap to feed, the world can do without them, unless and until they acquire some at least of that do-as-you-would-be-done-by behaviour which Confucius believed to be the key to decent and harmonious living among men. Confucius had a passion for neatness and concision:

⁶ It would be safer to say that it is a copy of an ancient painting, artist unknown.

but even he never achieved a greater triumph than his reduction of the whole duty of man to a single monosyllable—the ideograph which reads 'Shu', and means as nearly as we can translate it 'Benevolent reciprocity'. Meanwhile we cannot but admire the optimism of the Sage who thought that he could induce all mankind to live in harmony by merely saying 'Shu'. Today we are very doubtful that an explosion of atomic bombs will make them do so.

But all this is carrying on far beyond our present bounds : and anyhow the subject is an unpleasant one. For conclusion let us recall one rather out-of-the-way example of that Pictorial Art which once earned for Japan respect and fame among the nations.

In one of the many buildings of Daitokuji, the great Zen monastery north-west of Kyoto, there is preserved with devout care a painting by Sesshiu, the fifteenth-century priest-artist whom many consider Japan's greatest master of the brush. It is mounted as a Kakemono with rare and precious Chinese silks and kept for greater safety in three boxes one inside the other. Painted on paper—which incidentally is a more lasting material than silk—its subject is a simple one—a circle, a mere circumference, geometrically accurate, drawn with one powerful and unbroken sweep of the brush. The artist's signature completes the picture.

Giotto is recorded to have performed a similar feat, but his effort has disappeared. Sesshiu's freehand circle remains for us to marvel at, if to marvel we desire. I cannot however help thinking that almost any highly-trained far-eastern painter could emulate his performance if he practised long enough ; and I do not for a moment believe that the priests of Daitokuji preserved this drawing so piously because of its precision as a geometrical figure. Sesshiu was a Zen priest, and in his day an Abbot. The Zen (meditation) doctrine was taught by parable and example, not by principle, argument, or many words. One Zen priest is recorded to have said that the true value and significance of a cup is not the cup itself or the clay of which it is made : it resides in the emptiness which the cup encloses (7). And it may be that the significance of Sesshiu's circle is the blank space its circumference surrounds—a blankness emblematic of the ultimate end of things, the nothingness, and also the peace, which is Nirvana. But I believe that here he had a different image in his mind ; and that he was outlining with that deliberate unhesitating brush-stroke of his, which we recognize as his sign-manual, the fabulous pearl, round and self-luminous, which, for the devout, is the symbol of the Buddha and his Word.

⁷ Lao Tzu had already made much the same kind of remark. There is much Taoist teaching enshrined in the Zen doctrines.

Excavation of a Ring-fort at Garryduff, Co. Cork

by M. J. O'KELLY

THE excavation here briefly described was carried out at the end of the summer of 1945 and though not yet completed, the results already are of such interest as to make publication of this short report desirable. The work is being conducted by Michael J. O'Kelly, M.A., Curator of the Cork Public Museum, and is being financed by means of a special grant made by the Governing Body of University College, Cork.

The fort lies on the shoulder of a prominent knoll in the range of hills which divides the eastern part of Cork Harbour from a rich agricultural hinterland extending northward to include the valleys of the rivers Bride and Blackwater. Nearby modern towns of importance are Fermoy, 12 miles to the northwest, and Midleton, 9 miles to the south. The latter stands at the head of a narrow estuary which runs northward out of the eastern bight of Cork Harbour and probably marks the point at which seafarers—possibly arriving direct from the continent—disembarked to trade with the established settlers of the district, or to found bridge-heads for subsequent marauding incursions into the rich terrain of the interior. That the latter was a possibility foreseen by the early agriculturalists of east Cork is shown by their careful selection of a strategic site. The builders, who were members of a peaceful farming community (as is shown by the presence of agricultural implements on the site), placed their outpost so that it dominated the main pass which gave access to their territory from the south and the sea—the direction from which they believed their enemies were most likely to come.

The fort is a small circular structure with a single rampart (internal diameter 75 feet) and was first brought to notice when some potsherds discovered by the landowner, Mr W. O'Mahony, came into the possession of the excavator. As the sherds represented Roman or sub-Roman types similar to certain of the wares from Garranes (1) and from Ballycatteen (2), two sites recently excavated in west Cork, and as Roman wares are still a comparative rarity in Ireland, it was obvious that here was a site worthy of further investigation. With the landowner's ready permission, the work commenced, and at the end of some six weeks a little more than one quarter of the interior had been cleared. It is intended that the remaining portion of the site shall be completed this season.

Surface indications led one to suppose that the rampart, which at its highest point stood some 16 feet above the bottom of the surrounding fosse, had been wholly constructed of earth, but excavation revealed otherwise. A central core of clay and broken stone (the latter being the spoil from the rock-cut fosse) with a well-built stone facing inside and out, formed an imposing bank 15 feet thick and originally about 20 feet high. The first section cut through it revealed a series of 'old turf lines' running through the clay core. Dr Bersu, who visited the site, suggests that these may be the remains of successive layers of wooden logs placed transversely in the loose material to give it 'bond', rather than turf lines in the true sense. But this is a point which must be investigated further during the coming season's work. The defences of the entrance to the fort have not yet been examined.

That the interior contained a number of dwellings is shown by the discovery of several hearths, many postholes and a number of poorly preserved paved floors. These evidences of habitation had suffered badly and so far it has not been possible to recover the plan of any one building.

¹ ANTIQUITY, XII (March, 1938), 94; *P.R.I.A.*, XLVII, c (1942), 77 ff.

² *P.R.I.A.*, XLIX, c (1943), 1 ff.

EXCAVATION OF A RING-FORT AT GARRYDUFF, CO. CORK

The finds have been acquired by University College, Cork, and have been placed in the Cork Public Museum. They are of much interest and present some problems. As a class, our 30,000 or 40,000 forts are the type of monument about which least is

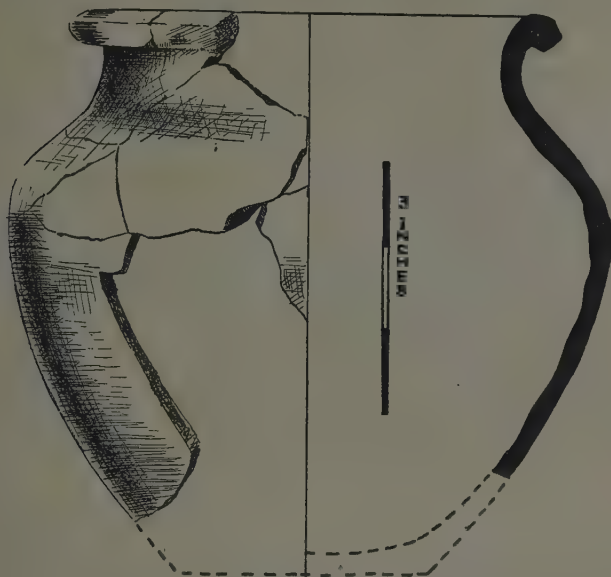


FIG. 1. RECONSTRUCTED VESSEL OF ROMAN COOKING-POT WARE

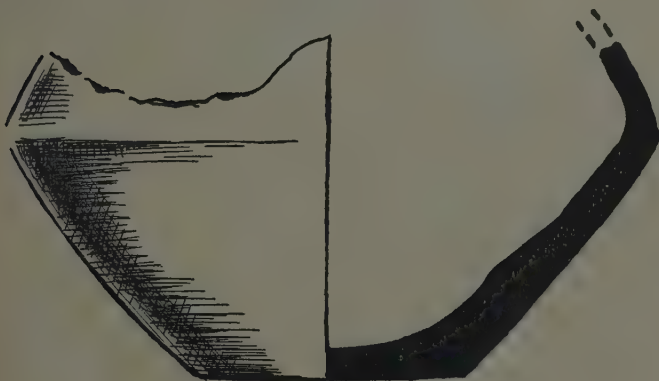


FIG. 2. SMALL POT OR CUP (1/2)

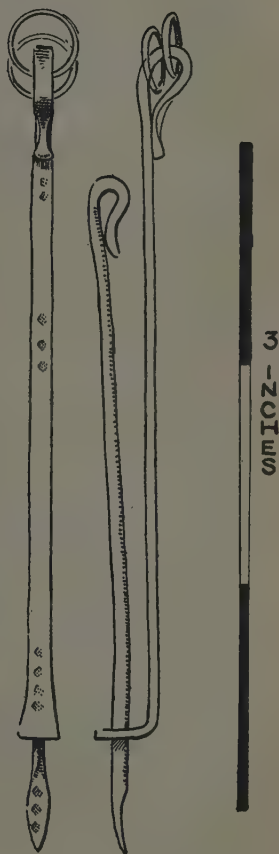


FIG. 3. BRONZE BROOCH

known, and the archaeologist who has the temerity to embark upon the excavation of one must be prepared for surprises. In this respect Garryduff was no exception. Except for the occurrence of the usual type of tanged iron knife, which in Ireland appears to be equally at home in almost any part of the first millennium A.D., and a few other

items, the finds for the most part are new and strange. In this connexion, the nearness of the site to the sea and the probability of direct contact with continental Europe should not be forgotten. However, this is not to suggest that everything—or for that matter any one thing—is an import, but rather that the site was open to strong cultural influences from outside.

The pottery, which is all made on the wheel, includes 'cooking-pot' ware (FIG. 1) similar to that from Garranes and some sites in Britain and Gaul, and while there was one sherd which must be regarded as 'imitation Samian', there were no amphorae fragments. A small vessel (FIG. 2) with a sharply carinated shoulder and of a somewhat similar paste to that of the cooking pot ware is paralleled on only one other Irish site, Lagore crannog, excavated some years ago by Dr O'Neill Hencken (report in the press), where a sherd with a similar sharply keeled shoulder occurred.

Among the bronzes, one brooch is of special interest, and though it belongs in the 'safety' class, it is no relation of the typical fibula. This object (FIG. 3) is in two parts, a straight pin and a straight bow. Both have looped heads which were loosely held together by means of a short, light bronze chain. A part only of the latter survives. The foot of the bow is bent over at right angles and contains a hole into which the point of the pin was slipped after it had been pushed through the cloth, the chain holding the pin and bow together allowing sufficient relative movement between the parts to enable this to be done. When in position on the wearer's clothing all of the bow, but only the point of the pin, could be seen. These visible parts are decorated with a series of cross-hatched punch marks, the pin point being specially flattened to accommodate this ornament.

The outstanding find, however, is a small gold ornament (FIG. 4) which is in the form of a bird—a wren, to judge by its outline—whose body bears a beautiful pattern of scroll-work executed in beaded gold wire filigree. The object is ingeniously constructed from a thin foil of gold beaten up to a convex form so as to give an impression of the 'roundness' of the bird's body. Into the concave area at the back is soldered a narrow strip of gold foil so arranged that it stands on edge and follows the outline of the cavity. The outer edge of this strip is provided with a series of projecting tongues (like those of the modern brass paper fastener) which, when the ornament was being worn, were passed through the material of the garment, bent over and clinched at the back. The front, or convex surface, bears the filigree decoration. A 'rope' motif forms a band which completely delineates the bird's body. The band consists of two lines of beaded wire with, between them, short separate lengths of the same wire set transversely. The separation line between the upper and lower parts of the beak is marked by a straight length of beaded wire, while the legs and the ends of the wings are indicated by triangles of gold foil, edged with beaded wire, which project beyond the line of the body. The central portion of the convex area is occupied by five S-scrolls cleverly fitted together so as to fill a rather awkward space. Each of the three scrolls occupying the area nearest the beak has a large and a small spiral, while the spirals in the two other scrolls are all of the same size. The central knop of one large scroll has been carefully positioned so as to represent the bird's eye. At the place where the relief is highest the beading has been worn off the wire as a result of exposure to rubbing, but in sheltered hollows it has remained in a perfect state.

The gold solder used throughout contains a high percentage of copper. The dimensions of the object are extremely small and this makes one marvel all the more at the high level of technical skill shown by the craftsman who executed the work. From beak tip to tail the bird is .6 inches long and the vertical height from the tips of the

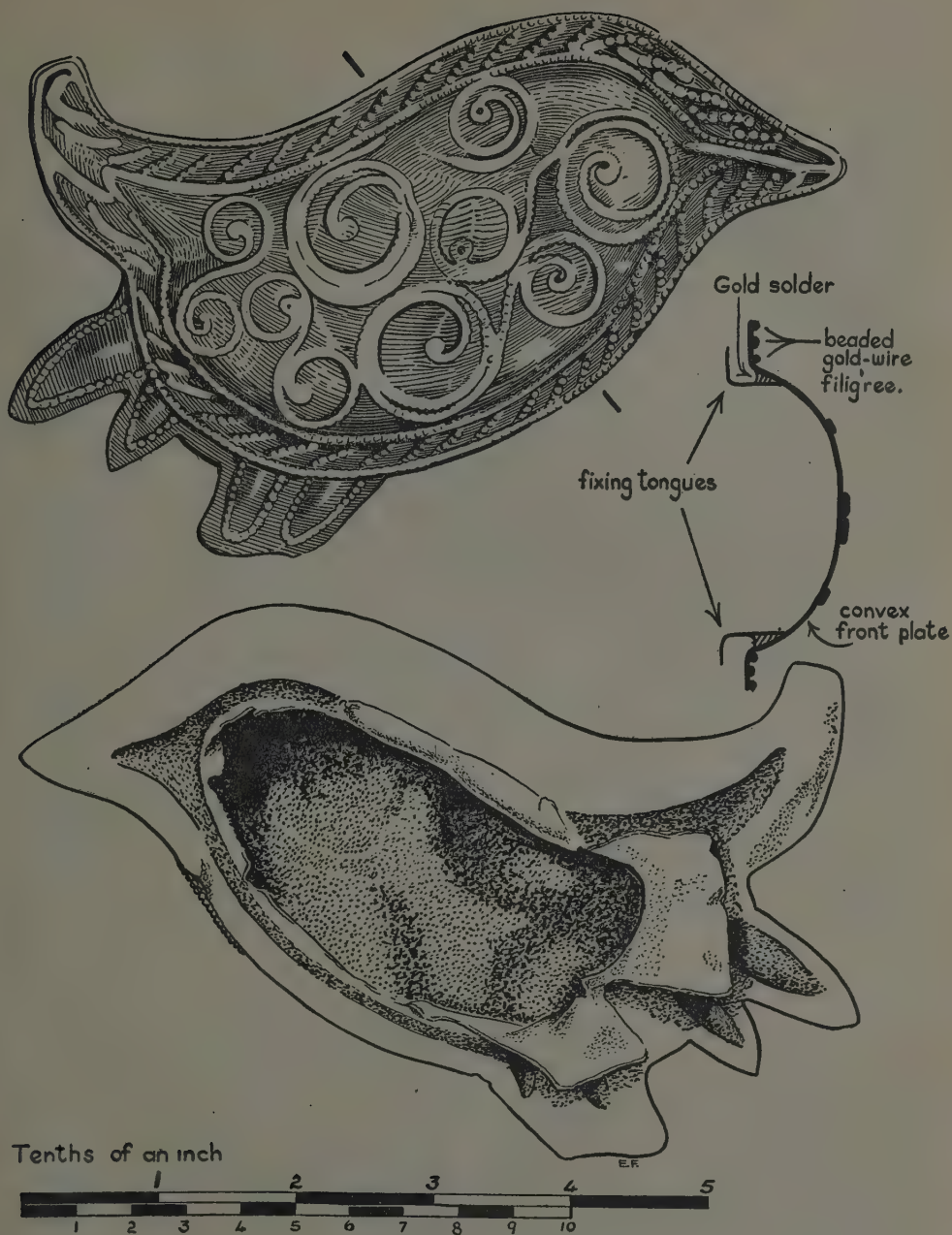


FIG. 4. GOLD BIRD FROM GARRYDUFF, CO. CORK
 [NOTE: scale given in tenths of an inch and in millimetres]

'legs' to crown of the head measures .4 inches, that is to say, the whole bird is about the size of one's little-finger nail!

Whether this unique ornament was made on or near the site is a question which cannot yet be answered, but evidence for metalworking at Garryduff is not wanting—fragments of small clay crucibles similar to those from other metalworking sites were found within the fort. It is too early yet to discuss in full the general implications of the find. They are many and must be considered in the light of the other evidence from the site when the investigation is complete. As the case is, therefore, still *sub judice*, one cannot do more than point to the relationship which this scroll motif has with certain of the designs on other Irish objects. Two of these which appear to have an 'Ultimate La Tène' context may be cited here—a latchet (3) in the National Museum, Dublin, which has a panel of opposed spirals upon the widened portion of the tail, and the Mullaghmast Stone (4), Co. Kildare, on the side of which the same motif is to be found. Authorities have differed widely when assigning dates to these, and the fact that neither of them is an example of filigree, perhaps reduces their value as comparative material. On the other hand, if one seeks amongst the well-known Irish beaded filigree work as it is found, say, in the roundels on the sides of the cup of the Ardagh Chalice (5), one is forced to admit at once that, in 'feeling', the Garryduff scroll-work is something quite different, that it belongs to an earlier time. But how much earlier? Speculation on this point is inadvisable until the whole field of relevant Irish metalwork has been examined more critically, for even in recent publications (6) descriptions of most objects are hopelessly inadequate from the technical viewpoint and the illustrations do not show the fine detail required. However, a *terminus ante quem* is perhaps provided if it is accepted that our Irish beaded filigree had its ultimate origin in the late Roman work of the 4th century as Kendrick (7) holds was the case in regard to the filigree occurring in the Kentish jewellery and in material from several Romano-British sites. In this connexion the finger rings (8) with beaded filigree ornament from Newgrange should not be overlooked.

As to the possible lateness in time of the Garryduff bird, one can say—but with all reserve—that the other material from the fort contains nothing which need be regarded as later than the 6th century. Final dating must, however, await what evidence completion of the excavation will bring forth. Meanwhile, it will be agreed that the importance of the site is unquestionable, especially in relation to some of the burning problems of the 'Dark Age' centuries and of what was once called the 'hiatus' in Celtic Art.

³ N.M.D. Reg. No. W 492. Illustrated in: *Christian Art in Ancient Ireland*, I, pl. I, 8; Leeds: *Celtic Ornament*, Fig. 36 (c); Henry: *P.R.I.A.*, LXVI, c (1936), pl. XXIX, 2.

⁴ Illustrated in Mahr: *Ancient Irish Handicraft*, pl. XII: 2; *P.R.I.A.*, XXIV, c (1902-4), pl. XXII, 1.

⁵ Dated variously between A.D. 700 and 1000. Recent opinion, however, favours a date in the 9th century as, for instance, Raftery: *Christian Art in Ancient Ireland*, II, 143, where he suggests A.D. 850.

⁶ *Christian Art in Ancient Ireland*, I and II (1932 and 1941, respectively).

⁷ Kendrick: *Anglo-Saxon Art*, 65-6.

⁸ One of these is illustrated in Kendrick, *op. cit.*, pl. XXXII, 4.

Ancient Egyptian Woodworking

by ERIC MARX

THE following notes are the result of an investigation undertaken as a bypath from the study of Egyptian shipping, in which questions arose as to the possibilities and probabilities of various constructional details, and the extent of the technical capacity available for the solution of shipbuilding problems. They were prepared in war-time, in England, when it was not possible to examine any actual specimens and are therefore based entirely on published data, descriptions, drawings and photographs. The purpose of the investigation was not concerned with the uses to which the Egyptians put their woodworking ability, or questions of artistic design or decorative or religious intention, but was solely concerned with their methods and means of fabricating wooden articles and structures, together with the associated employment of certain other materials which became integral parts of the structures.

The scarcity of wood in Egypt is well known and needs no amplification and is attested by many references which show its importance. The misadventures of Wen. Amon (1) in search of wood provide us with one of the most vivid stories which have come from Egypt. Wood came from Syria, as is frequently mentioned, and from the South, (2) and as early as the time of Seneferu of Dynasty III there is a record of forty ships bringing wood, probably from Syria, in fact imported wood was probably essential for many constructional purposes.

Some 24 different kinds of wood, many of them still unidentified, are named in the course of Breasted's *Ancient Records* (3), in fact it seems that use was made of every kind of wood which was in any way available. Among those which have been identified by actual examination of the remains are cedar, cypress, fir, beech, box, juniper, lime, pine, oak, yew, acacia, persea, sidder, sycamore fig, willow and tamarisk (4). Ebony was also imported and the date-palm used for such purposes as roofing, though it is not suitable for joinery. For building, linen, leather and rope were available, the latter made of palm fibres, flax fibres, grass or papyrus. Basket-work or matting was in use from predynastic times and various forms of plaster, gesso (a mixture of whiting and glue) and pitch were much used. Metal rivets or nails were introduced probably about the 18th Dynasty.

In the earliest times during which we are acquainted with the Egyptians their tools were of stone, but it must be admitted that they developed a fine technique for working them. Not enough has survived from these remote predynastic times to show what their woodworking was like, and it is not until we come to the earlier dynasties of the Old Kingdom that we can learn much of their craftsmanship in wood. Metal had been introduced for some tools although probably stone was still used, at least for the rougher work until copper became commoner. During most of the historical period, metal tools were certainly in use. Foremost among them was the adze in various sizes, seemingly copied in metal from the original stone models. Only the blade was in metal and it was fastened to the wooden handle shaped like a forking branch of a tree, one side of which was cut off short, by means of lashings. The axe was similarly made with the blade attached to the haft by lashing, the other end of the shaft turned slightly as many still do today. There was a saw something like a large carving knife with a curved handle suitable for exerting a downward pressure, also a selection of chisels with metal-working parts no larger than necessary, set in wooden handles, and a mallet something like that

used by masons today. Drilling was done by means of a bow-drill. The metal tool was mounted in the end of a wooden shaft and was held against the work by the 'mother', a wooden cup on the end of the shaft. The string of the bow was wound round the wooden shaft so that by moving the bow sharply to and fro the tool rotated rapidly. For smoothing the work the adze was probably the principle tool (5) as it was in England in the middle ages when a skilled man could produce extremely fine work with it. Some pictures in tombs show the use of a conical stone, something like a sugar loaf, rubbed up and down, perhaps serving for a final finish as we might use sandpaper. Work was marked out by means of charcoal but it is not clear whether lines were ruled against a straight edge or whether a plucked cord was employed. A plumb line was used for a vertical and a square was also used. The vice was not known but a post planted upright in the ground was used to which the work could be lashed when using the saw, at any rate with larger wood. They apparently had a block of wood standing on the ground with a ledge cut in it where they could rest their work.

Wood was always scarce and, if imported, expensive, so that it was only natural that economy was practised in its use, and every piece conserved carefully. This seems to have been a guiding principle in all their work. Nothing was wasted that could be used and care was taken to use everything possible. Bent branches of a tree would be used where curved pieces were required, as in fact was still done by shipbuilders of the 18th century A.D. (6), and when successive planks were required to the same curve they would be cut from the same log. Planks were usually cut by sawing and with the poor tool at his disposal must have been a laborious task for the Egyptian. Sometimes an axe was used but this would have been more wasteful. The adze then came into use to trim and smooth the plank. Carving was probably by adze in the first place to cut all except the smaller hollows and these would be worked by chisel, either with or without the mallet. Curved pieces were not always made the same way. Sometimes they were cut that way from the solid or ready curved branches, as for example the cross beams of some cylinder shaped lids of coffins, and the planks fastened on them were then trimmed to a curve, presumably by the adze. On the other hand wood was bent with remarkable facility, sometimes even quite substantial pieces, for example the chariot of Yuua (7) is made of bent wood for the frame of the floor and the handrail, while each wheel consists of two pieces of wood, one piece being bent to form five-sixths of a circle. How this bending was done is not clear and there is no evidence of steaming or boiling which of course does not exclude them, and one of these was probably the method employed. Similarly there is no evidence of the use of jigs or clamps. They may have been used, but judging by the frequent lashing for other purposes this was probably also used for any temporary fixing.

One result of working with the limited range of tools available was a preference for square shapes, rather than circular when one piece had to be inserted in a hole in another. The practice was perhaps fortunate in that it ensured greater rigidity and avoided any likelihood to twist round. It was quite usual, though there is not enough evidence to say it was universal, for masts or posts in a boat to be square in section where they were inserted in sockets for mounting. Above that they often chamfered off to an octagonal section or even to an approximate circle. There are several ways of attaching one piece of wood to another and all except one were used by the Egyptians. The exception is the metal-screw which only came into use in quite recent times and there seems to be no sign of it in Egypt.

When two pieces of wood are brought together, whatever the method used to secure them in position, they can be shaped in various ways to fit. Some of the shapes interlock

ANCIENT EGYPTIAN WOODWORKING

so as to secure the wood in position, different shapes being used as may be required. The simplest way is the plain butt in which the end of one piece is brought against the side of the other. A little less crude is the mitre, the edge or end of each piece being cut on a slant to fit against the corresponding cut of the other. The rebated butt has the side of the one piece cut away so that the square end of the other fits into it and, developed from these, are the shoulder mitre and the double shoulder mitre. Another form is known as halving, the remaining part still being the same shape and length in each and they are then placed one over the other. Sometimes there can be a combination partly halved and partly mitred, known as mitre housing. All these methods were in use in the Old Kingdom and were found employed in the construction of coffins at Heliopolis dating back to Dynasty III (8).

An improvement on the mitre housing was made when the flat 'halving' portions were cut with a slope on one surface of each to fit into correspondingly shaped parts of the other piece, so that when pushed together they locked in position. This is the dovetail mitre housing and came into use in the period from Dynasty III to Dynasty V. It is not clear at what date the true dovetail-joint came into use, but certainly in Dynasty XII double-ended dovetail dowels were inserted to join planks end to end, that is pieces of wood tapering like a wedge from each end into a waist at the centre inserted in correspondingly shaped recesses (9). It seems very probable that they were used considerably earlier in shipbuilding as there are some features of ships, even at early periods, which seem to imply joints of this type, but there is no proof.

Another form of joint is the mortice, which consists of a slot cut in one piece while the tongue is cut in the end of the other piece to fit in the slot, this tongue being called the 'tenon'. This was in use in Egypt at an early date but the economically minded woodworkers apparently saw in it an objection in that it shortened the effective length of the tenoned piece by the length of the projection at each end. Where wood was so precious, especially long straight pieces, this was important, so an improvement was introduced. Slots were cut in both pieces in corresponding positions and separate tenons then inserted in both to effect the joint. Thus no length was wasted and it was possible to cut the slots quite accurately, so that very little play had to be allowed to obtain a fit. The joint was perhaps not quite so good but this became a widely used method, not only for the ends of wooden members but for the sides of adjacent planks. The slots were cut by chisel and the separate tenons were sometimes taken from one lath. A v-shaped cut was made by a stroke from an adze in each direction and the required piece then snapped off (10). Sometimes when a series of planks were fitted side by side a groove was cut all along each side-piece and the ends of the planks were fitted in these grooves (11). This was a regular method in cabinet work up to the 17th century and still used today. In order to strengthen and keep a joint rigid, particularly one in a framework, that is to say where the whole surfaces are not filled in by planks a right angled elbow piece is sometimes fitted inside a corner. Whatever the kind of joint or even if there was none the woodwork was nearly always secured by wooden pegs or 'trenails'. A small hole was drilled sometimes slightly tapering and into this a wooden peg was forced, presumably hammered firmly home and then cut off flush on the outside. It has been mentioned that larger pieces for inserting in a slot were usually cut square, which was easier than round, but for the pegs the governing factor was the drill which produced a round hole and in this smaller scale a circular form was easier and was therefore general although square pegs are in fact known. Probably the smaller arms of the native trees were used.

Pegs were used in large numbers. Even where the joint itself might have been

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sufficient one was often put through it to make it really secure. For example sometimes they were put at an angle and in a mitre joint the pegs would be at right angles to the line of the joint, that is to say across the corner. Planking for the bottom of a box or coffin was sometimes fastened on by pegs at an angle, just as a joiner today might drive his nails at an angle for greater strength. In fact the pegs served the same purpose as the nail of today and were in effect its direct ancestor.

Often two short lengths of wood had to be joined to lengthen them or to make a curved structure, in which case they were usually halved together with two or more pegs inserted. Glue was used to join wood though the date of its introduction is obscure (12). In the 18th Dynasty it was apparently used from blocks, one of which has been found at Deir-el-Bahari (13). It was heated in a glue pot for applying to the work by means of a stick or some kind of brush. There was another entirely different method of attaching one piece of wood to another. This was by tying with strips of leather or linen, string or rope. In various forms this method is still used for shipbuilding in different parts of the world and in some cases it has peculiar advantages and is sometimes referred to as 'sewing'.

Two principal forms are found. In one, holes are bored, or more usually cut by chisel in the two pieces of wood where they butt against one another, so that a cord can be passed through from one piece to the other and round again over the surface several times, pulled tight and fastened. In the other method holes are cut in a 'V' form so as to leave a bar of wood. This is done in the surface of each piece of wood, near the joint but not affecting the surfaces which actually meet, and the cord is then laced under the one bar along past the join and under the other bar several times round, thus keeping on one side of the work all the time. It seems probable that this particular form was developed for use in ships where all these fastenings would then be kept on the inside of the hull. In both forms grooves were often cut where the cord ran along the surface so that a flush finish could be left. Cord was also used to lash two pieces together, possibly over a halved joint, quite a substantial lashing usually being applied. Sometimes a cord and a peg are combined in a fastening through the same hole, the peg presumably having been driven in afterwards as greater security for the cord.

Probably there were routine articles which were made by the Egyptians without any preliminary setting out of the work. Objects which they were accustomed to make regularly could quite well be done by rule of thumb in that way, just as they are today, but with articles or structures of special design some sort of plan was necessary. This was provided by a drawing on papyrus, or perhaps ostraca might sometimes have served. Possibly two views would be shown with a squared pattern superimposed and the whole drawn to scale. One such drawing of a shrine has been found (14). It seems that some sort of measure must have been used, the equivalent of the modern workman's 'two-foot', both in order to follow such a plan and so that such details as the position of mortice holes could be marked off. However the actual measuring was done charcoal was used to mark the positions.

CONSTRUCTION

There is much in common between the work of the medieval and the early 17th century craftsmen and that of the Egyptian workman. In both cases their constructional woodwork was usually framed, that is to say a structure consisted of a visible frame filled in where necessary by planks, although in the case of Egypt the word 'visible' should be qualified to allow for a decorative material covering the entire surface. The Egyptians however had a wider range of technical possibilities at their command than

the medieval worker and in several ways they were the better craftsmen. Their frames were usually substantial affairs, but on the other hand they were capable of making a light structure with absolutely nothing superfluous, employing a really delicate touch, as for example in a chariot made mostly of bent wood (15) and of the lightest possible construction consistent with the necessary strength. Instead of heavy planking to fill the frame they could use matting or something like wicker, basket work, or leather fastened by copper or bronze tacks, like the chairs of Charles II, or they could use leather matting laced through holes in the frame. Trellis work was also used, the laths being halved together and each fastened by a peg (16). In general the practice seems to have been first to make sure of a sound basis on which to build up the structure either in a main framework of stout timber, or by making a floor on which walls and other features could be erected. The use of a diagonal strut to ensure rigidity was well known, as is seen by various boxes (17) and the model squares of the 9th-10th Dynasty (18). The lines of their work were not kept parallel or rectangular when the designs led them to other shapes. Inward sloping sides of shrines, caskets and other items are common, chair backs sloped backwards; and many instances could be quoted from shipbuilding. This feature of Egyptian design, which was really quite common, implies considerable skill in setting out and planning the work in the component parts, as any woodworker knows. Not only are the lengths of the frame members more difficult to determine, and the shapes of panels inclined against other inclined surfaces, but the angles of joining surfaces become very awkward to foresee unless the designer is prepared to indulge in some three-dimensional geometry or trigonometry. The cutting of a dovetail joint or even a mortice and tenon when the members are sloping at different angles is by no means an easy task, but it was one which was regularly done in Egypt. Probably a process of trial and error came into play in the adjustment of a really true fit, but that does not seem to be sufficient to explain the setting out of all the parts for some of the quite elaborate work which was produced.

In furniture a lightness of design is evident with some very practical features much in advance of European styles up to the latter part of the 17th century. The frame of chair-seats was used to hold a sheet of leather, usually decorated, fastened on with tacks, or a woven leather surface through rows of holes (19). Sides and backs of chairs instead of a solid filling often had carved open work decoration or leather work again. The back is never high and the arms are curved so as to take the arms of the individual comfortably. Chair backs frequently slope back and in order to support them struts are often placed just where they are required to give the necessary strength. Chair legs and other items of furniture were frequently carved in imitation of the legs of animals, and the back legs are often splayed in a manner which gives greater security; this is usual today but has only been reintroduced within the last 280 years. These carved legs usually ended with the paw standing on a small block which not only enabled the four legs to be levelled without affecting the carving but also prevented the legs rotting and having to be shortened as has happened to so many oak and elm chairs in this country. If any rot did appear the small block could easily be replaced without harming the appearance or strength of the chair. Beds were made in a way very similar to that of the chairs. Sometimes the frame was assembled from separate straight pieces, but examples are known where each side is made in one piece, having one leg with a mortice cut in the top of the leg to receive a tenon from the adjacent side or end. These date from about Dynasty I (20). Beds in a hot climate are nearly always harder than in northern Europe but some resilience was provided in Egypt by making the mattress of plaited linen strings or some similar material (21). In the actual framework stringers were used

to stiffen the legs in position and knee pieces are often found in the angles. Doors both in furniture and in structural work were usually hinged by means of projections at top and bottom resting in sockets above and below, incidentally a stronger method of mounting than that of applied hinges (22).^{*} Sometimes the projection was part of the door's planked surface; sometimes they were carved as part of the top and bottom pieces of the frame and examples have been found of metal pivots for fixing over the woodwork (23). Applied hinges of the modern form were however also known and were used for example on a casket in the tomb of Tutankhamen (24).

Mention has already been made of the chariot found in the tomb of Yuua and Thuia which was constructed largely of bent wood. The bending of a strip of wood into a curve amounting to five-sixths of a circle indicates a considerable mastery of the technique involved, and mortices were then cut to take the tenons of the six spokes which at their other end were tenoned into the nave and shaped so as to be faired onto it. There is a fixed axle-tree on which the wheels revolved being secured by linch pins and it is worth noting that there were traces of a black lubricant on these bearings (25).

Reference must be made to the remains found at Tarkhan of some construction consisting of stout timber uprights joined together by binding with cord through holes drilled in the wood and, in effect, concealed from the outside (26). The planks overlap one another, differing from the usual Egyptian practice of economizing wood by placing edge to edge. This has been referred to as the remains of a portable house, but it is difficult to see why such a substantial house should have been built in the climate of Egypt and, while it could certainly have been dismantled and removed the labour involved would have been considerable on account of the weight of the wood alone. Most houses in those days in Egypt were more likely to have been of very flimsy construction. It seems much more likely that this structure was part of a fortification erected to withstand attack. The peculiar method of overlapping the wood and fastening by tying would allow considerable resilience in withstanding the impact of heavy missiles, or battering rams which would make it useful for that purpose.

The Egyptians paid considerable attention to the finish of their work and incidentally had a liking for strong colours. Most of their wood-work was either painted, or in the case of that made for the nobility or royalty was embellished with applied decoration; but when it was left bare there does not seem to have been any effort to apply a natural waxed finish as is common in oak furniture in northern Europe. Beeswax was well known and was used both as a base for paint and as a protective coating, sometimes applied over painting or inlay but if it was used for treating the wood the fact either is no longer evident or it was not noted by the finders. Painting was sometimes applied direct to the wood but often a surface of plaster was first provided and the painting done on that (27). Sometimes an inferior wood was worked and finally painted to imitate a more expensive one, another practice which has its counterpart today and possibly for the same reason. Inlay was frequently used either of other woods (particularly ebony), or of precious or semi-precious stones or ivory or using a coloured paste. Veneer was also employed whether as a development of the technique of inlaying or as a separate technique is not clear, but the former is doubtful in view of the different handling required. The veneer is usually from two to four millimetres in thickness and it calls for remark that such thin sheets have been prepared with the rather clumsy saws and the other tools which they had available for the purpose. Unfortunately there is no evidence to show how it

^{*} A door made of a solid slab of stone with similar projections is to be seen, still in position and functioning, in the Roman city of Umm el Jemal in Transjordan. O.G.S.C.

was done but considerable care and skill must have been exercised. Glue was probably used in fixing but as might be expected small pegs were also used in fairly close spacing (28). Veneer has been found on boxes, chairs and bedsteads, and the craftsmen do not seem to have been limited to flat surfaces.

Plaster was much used as a uniform covering on which to apply painting and also to build up mouldings or figures in relief and to patch up faulty places in the wood. Plaster was also used as a base for gold, silver foil and gold leaf, which were frequently used as decoration. Repairs were carried out in a very neat manner by the use of plaster, the faulty wood being cut out first, or in larger objects by the insertion of a piece of wood, the edges first being bevelled so that the patch would not fall out (29). In one example the patch was lashed in place by leather strips through holes. It is worth noting that the primitive dug-out boat found at Brigg in Lincolnshire was repaired by the same method.

There is one example of plywood from Egypt (30). A coffin of six-ply wood, dating from the Old Kingdom now in Cairo Museum, was found at Saqqara. The layers of wood are a little less than four millimetres thick and are placed with the grain alternately in each direction just as in the modern equivalent. Tiny tenons join successive pieces and apparently there were pegs through the whole to keep the layers together. Uprights made of two solid pieces of wood form supports inside the corners, which are joined in a mitre and apparently it was covered by a sheet of gold pinned on by little gold pins.

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11. Petrie and Mackay, op. cit. p. 29.
12. Newberry, op. cit. plates 17, 18.
13. Carter, *Tomb of Tut-ankh-Amen*, II, p. 166.
14. *Ancient Egypt*, 1926, p. 24.
15. Davis, op. cit. p. 66.
16. Daressy, *Fouilles de la Vallée des Rois*, plate 36.
17. Davis, op. cit. plate 38.
18. Petrie, *Sedment*, plate 26.
19. Davis, op. cit., plate 35.
20. Petrie, *Tarkhan I*, p. 23.
21. Cairo Museum Catalogue, *Tomb of Yuua and Thuia*, p. 50.
22. Reisner, op. cit., no. 4918.
23. Clarke and Engelbach, *Ancient Egyptian Masonry*, fig. 188.
24. Carter, op. cit., plate 57.
25. Davis, op. cit. p. 35 and Cairo Catalogue, p. 65.
26. Petrie, *Tarkhan I*, p. 24.
27. Davis, op. cit. p. 27.
28. Davis, op. cit. p. 37.
29. Petrie and Mackay, op. cit. p. 23.
30. *Annales du Service*, xxxiii, p. 163.

Prehistoric Fishing Methods in South Africa

by A. J. H. GOODWIN

IN the course of many years of archaeological research in South Africa, cut off by the length of the continent from the European scene, various local problems, unrelated to those of Europe, necessarily arise. One of the most persistent has been that of the origin and age of coastal fishing enclosures whose distribution extends sporadically from the mouth of the Berg river in St. Helena Bay (northwest of Cape Town) to Kosi Bay on the Zululand coast, and perhaps even further in either direction. The known coastal range is well over 1000 miles. Any complete solution of the various problems raised must necessarily be shelved until petrol supplies permit the careful excavation of a series of surrounding midden deposits.

The enclosures are known locally as *vywers* (pronounced much as the English 'favours') or sometimes as *viskraals*, literally dams, or fish-corral, and we can speak of them in English as tidal fish-traps. Happily their use continues, in a somewhat sporadic way, at several of the sites, and we can still study the methods used. In brief, the enclosure is built up as a dry-stone wall to such a height that normal high tides will cover the *vywer* and permit fish to swim freely over the enclosed area. As the tide sinks, the water runs out through the interstices between the stones, while the fish are trapped and can be clubbed and caught by hand. It is a simple application of the system used for netting fish, though here the dry-stone walling provides the imbrications.

No notice whatsoever has so far been taken of these *vywers* in our scientific literature, and I have seen no reference to this fishing method in the works of early local travellers. The only analogy known among existing Bushmen is quoted by Schapera (1) who describes stone walls built across rivers or in pools for catching fish. This marked lack of literature has made it all the more necessary to collect and publish available data on this problem, to record something of the methods used today, and to get some estimate of the probable age of these South African fish-traps.

Our only certain method of dating these *vywers* will be the excavation of stratified middens or cave deposits in close association with these traps, and the correlation of stratification with the traps. While no such convenient deposit has yet been studied, considerable corroborative evidence has already been obtained. For instance, when excavating a rock shelter near the town of George, an interesting sequence was revealed.

OAKHURST SHELTER

The shelter is situated beneath an overhanging cliff of quartzitic sandstone in virgin forest, halfway up the escarpment of an old peneplain that lies some 300 feet above sea-level. The deposits cover the local Later Stone Age (broadly comparable typologically with the Upper Palaeolithic, Mesolithic and Neolithic of western Europe), and the included series show a sudden marked increase in the use of vertebrate fish, such as can

¹ Schapera, *The Khoisan People of South Africa*, Routledge, 1930, p. 138.

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only be explained in terms of a suddenly increased ability to catch fish. This occurred in comparatively recent times, and is associated with a cultural change.

The site is situated some distance from the sea, and a mile away over difficult country lie a series of sand-dunes, sand-locked lagoons and blind rivers, caught back from the sea by the 20-foot Quaternary beach that seems to have marked a change of sea-level within the Middle Stone Age (broad Mousterian analogies). The shelter was at first used by man only as a casual stopping place in his journeys from the coast to the peneplain above. The original overhang provided insufficient shelter and no real protection from driven rain, so that the bulk of the lower deposit consists of windblown sand, humus, etc., while here and there can be seen scattered fireplaces surrounded by burnt and unrecognizable chips of white quartz. In contrast to this, the overlying deposit consists of 7 feet of kitchen midden, which has accumulated over a very long period of time, and has been compressed into a compacted mass. This midden encloses a series of cultural layers, evenly stratified one above the other.

The lowest recognizable deposit shows that the earliest inhabitants had a Smithfield B culture (perhaps analogous to the Lower Capsian, but of local development), and this is followed by a further phase, the Smithfield C, tending to evolve from the B stage towards a microlithic industry. This whole Smithfield complex is normally limited to the Uplands of the Union, and has quite certainly been mainly a product of the Free State area with its abundant local indurated shales. Here and there Smithfield elements seem to have broken through the southern mountain chains and to have reached the coast, necessarily making use of local materials to produce their traditional culture. In this instance it has been translated into white quartz, and is therefore somewhat anomalous. Up to this stage, shellfish were eaten, but only a few otoliths and bones from vertebrate fish occur, showing that they were seldom caught.

Above the Smithfield C deposit lies a thin layer of normal Wilton. This culture has its nearest Mediterranean equivalent in the Djebel Redeyef shelter and comparable sites in Tunisia, where it is regarded as a contact between early Neolithic and Final Capsian microlithic cultures. While the Smithfield C shows small implements, these are not truly 'microlithic' in the full sense of the term, but merely Smithfield B types markedly reduced in size. The Wilton is a true microlithic industry, though the microliths are confined to semi-lunates, crescents and minute ostrich-eggshell bead-borers. The normal Wilton layer (an inch or so thick) is typical of the Wilton common throughout the Union, and shows no local peculiarities. After this remarkably short beginning, the deposit changes, and for three feet the Wilton shows a peculiar development that I have only been able to recognize at this site and (less markedly) at a shelter of identical age immediately above the old 20-foot raised beach a mile away. The small stone crescents are entirely replaced by somewhat larger crescents, neatly made from the flat portion of the *Mytilus* (common blue mussel). This developed Wilton is thus a pure shell culture, depending for its raw materials on the resources of the midden itself. A few scrapers made from *Donax* shell appear, and the only other tools consist of innumerable chipped pebbles, broken and trimmed to a prepared edge suitable for removing shells from rock, or for breaking up recalcitrant shells at the home-site. This deposit continues without change until the final eight inches is reached, immediately below the present surface of the shelter. Here good pottery of the common coastal type makes its first appearance. Round-bellied pots occur, each with a pair of pierced clay lugs on either side of the shoulders, with little or no eversion at the mouth, but with a slight rim, and with a round-pointed base, showing general analogies in shape with certain predynastic Egyptian forms. The pottery is again identical with the Djebel Redeyef material

from Tunisia, and the association of bored stones, ostrich eggshell beads, coloured ochres and typical bone awls, together make this final Wilton congeries at Oakhurst almost identical with the 'Intercapsioneolithic' of Tunisia.

In the course of the Oakhurst excavation it was noticed that whereas in the pre-Wilton midden deposit, few fish-bones and otoliths occur, above that level they increase enormously in number and variety. There can be no question of any deterioration, as while fish-bones from small fish might disappear, otoliths seem to be made of sterner stuff, and would certainly have been found by the methods used in excavation. Until the normal Wilton period, fish must have been caught rarely and sporadically, or perhaps merely collected dead from the beaches. Now, coinciding with the normal Wilton and covering the whole local period of the developed and final Wilton, the inhabitants found means of catching fish in quantity and with great regularity. Vertebrate fish (in contrast to the more sedentary shell-fish) become an integral and regular part of the diet of these people. Search was made for some form of net-sinker or for a primitive fish-hook, but neither was found, nor was there any unusual element found that might conceivably have been used for fishing (2).

The fish-bones appear to have considerable permanence, especially if burnt, but scales and otoliths (the hard porcelain-like bones from the ears of fish) show that an abundance of vertebrate fish was eaten. Dr K. H. Barnard has identified Bishop (*Pagrus*), Elft (*Pomatomus*), Eagle Ray (*Myliobatis*) and various others.

Much the same state of affairs is seen in the Klip Kop cave at Hermanus (3), where Dr Barnard identified fishes of the genera *Pagrus*, *Dentex*, *Sparus*, *Diplodus*, etc., in quantity. All these types form part of the modern fauna. There is thus every indication at Klip Kop that vertebrate fish could be consistently caught and were the normal food supply. The deposit in this cave shows no pottery, and it is obvious that the cave had been filled too full to have been of use to the late bearers of the coastal pottery. Exactly the same type of pottery has been observed on the surface of neighbouring middens.

SLANG RIVER AND GOURITZ RIVER

The same phenomenon can be observed at many of the open-air middens scattered along the coast. The earliest middens have neither vertebrate fish nor pottery; the next have shell-fish, vertebrate fish, and no pottery; the most recent contain fishbones and pottery. This is not always so, as a shelter above Kalk Bay village (Cape Peninsula) shows abundant shell-fish, associated with a few Wilton tools, but few vertebrate fish and no pottery. This is curious, as I remember a *vywer* a mile or so along the coast 35 years ago, since converted into a swimming pool. While true comparative chronology is not far advanced in South Africa, it is quite certain that the pottery found along the coastal belt of the extreme south cannot be more than one (or at the very most two) thousand years old. Allowing for the heavy compression of the midden deposit at Oakhurst, we can suggest at least four times that period as a very low estimate for the developed Wilton deposit of 3 feet thick.

Some years ago, when working on midden deposits I had discovered at the mouth of the Slang river, Humansdorp, my attention was drawn to a number of *vywers* situated in close relationship to the very considerable middens that cap the coastal dunes. While

² Goodwin: Archaeology of the Oakhurst Shelter, George, *Trans. Roy. Soc. S. Afr.*, vol. xxv, 1938.

³ Goodwin: Klip Kop Cave, Hermanus. *Annals, S. Afr. Mus.*, xxiv, 5, 1938.

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much of the midden was old, some at least was fresh and recent, and unaffected by crushing. Fish-bones and pottery both appear in the middens overlooking these fish-traps.

A mile or so away there is a second group of middens of very considerable interest. There was every indication that the users had lived there until a century ago, and had left their fireplaces and middens in perfect condition when they gave up the site. These recent middens border a tidal lagoon about a 100 yards wide and of similar length. While extreme tides covered the area, it apparently drained quickly, and was sufficiently sheltered by sand-dunes to provide a convenient spot for eating. About the edge of the lagoon are to be seen midden heaps, quite fresh and untrodden, and still standing in the natural conical heaps, 9 or 10 feet in diameter, and 3 or 4 feet high, where the shells were originally thrown. A peculiar phenomenon can be observed here more clearly than in cave deposits; each separate shell-heap is composed of a single type of shell, almost exclusively. Quite certainly this neat arrangement is fortuitous, and merely reflects the way in which the midden makers consumed the available supplies of a particular shell-fish from one source and then turned to another, alternating between rock-mussels, periwinkles, sand-mussels and back again. The eating sites in the lagoon were shifted at the same time, so one heap yields sand-mussels, a second rock-mussels, a third periwinkles, a fourth *Donax*, and so on. Near the mouth of the lagoon three shallow bowls of roughly built stone, each 3 feet in diameter and about the same distance apart, were used as fireplaces. A similar shallow bowl of stones was observed in the Kalk Bay shelter, but I have been unable to locate other examples. The abundance of ash and carbon shows that these were fireplaces, though at Slang river there is no local accumulation of midden, which would suggest that the cooked food was carried some 25 yards away for eating.

The *vywers* associated with the older Slang river middens are on a somewhat larger scale than those we shall discuss later from the Agulhas area and elsewhere. At the Slang river mouth a pebble beach overlies the sand. The pebbles have been stripped from a large area and have been banked up against the standing rock bordering the sand, or have been built into wide-based heaped walls. Here and there a smaller pool within the larger enclosure has been built, and the walling here is similar to that used in *vywers* further west. The most striking thing about the Slang river series is their extent. They run along the coast for perhaps a quarter of a mile, and extend some 200 yards out to sea, partly protected from the waves by large standing rocks (PLATE I).

At the end of March 1943, I received a letter from Mr E. Pike, of Great Brak river, near Mossel Bay. Apparently we have the same phenomena here too, for he writes: 'As regards the *vywers* which you mention, there is a very large one near the Gouritz river mouth, which I have long contended was a *visvywer*. It is about 300 yards long, and runs out to sea about 100 yards. This must have been of very ancient origin, as all the walls have nearly disappeared with the exception of one small bit on the north side, where you can still trace the actual wall. The inside is nearly all sand, and the side to seawards is round boulders, extending for at least 100 yards or more into the sea. On either side of the *vywer* the round stones continue from the sandy beach right into the sea . . . The shells also seem sorted out; at one place you will find a heap of Venus' Ear shells (*Haliotis*) of the large variety (about 5 inches or so) partly buried in the sand but very worn, perhaps due to the actions of sand and wind. Then another heap will be of ordinary mussel and so on'.

With this second series of fresh midden deposits in front of us, it would be interesting to assess the rate of accumulation of shell-heaps. I have some evidence on this point, as shell-fish are still frequently eaten by the detribalised coastal Hottentots and 'Cape

Coloured' people along these shores today. I have watched a man collect, cook and devour a petrol-tin full of shell-fish. The bulk of the discarded shells therefore measured five-sixths of a cubic foot. It is no uncommon sight to see this quantity of shell-fish being prepared for one individual, and the quantity of edible fish contained in that volume of shell would not seem to be excessive for what may be the only meal of the day. Six people could thus account for 5 cubic feet of uncompressed shell *per diem*. The crushed shell would be in the neighbourhood of half a cubic foot, as I have found that the original bulk is crushed to roughly one-tenth. This means that in a year 6 people would accumulate over 1800 cubic feet of uncompressed shell, or 180 cubic feet of compressed shell. (50 cubic metres and 5 cubic metres respectively). It is clear that a very considerable bulk of fish shell does not take long to accumulate.

AGULHAS REGION

During the second year of the war I was able to pay a visit to the Agulhas area, a region sparsely inhabited, save for a few fisherfolk. Several attempts have been made to found fishing villages, but with relatively little success, as the coast is too open and wild, while the windswept flat country immediately behind the shore is hardly more inviting and provides no local market for fish. It consists of a wide shelving peneplain covering the 12 miles inland to the hills immediately above Bredasdorp and Napier. The plain is almost featureless moorland, and there is no indication of sheltered valleys or windbreaks where early man might have lived. The whole plain is covered by scrubby bush, with here and there curious open bands of grass, that suggest some ancient pattern of a different drainage or soil. A few vleis or fens feed slow-moving perennial streams that cut their serpentine paths to the sea, and provide foci for a few fairly prosperous farms. I have searched the area for implement sites, but with little success, and there seems to be no material available from which implements might be made.

At the coastal edge of the peneplain the entire shore is covered with scattered midden, perhaps 100 yards wide where the coast is flat, but disappearing or filling rock crevices where the shore is rocky. Along this coast I was able to visit five sets of *vywers*.

ST. MUNGO BAY. A pair of *vywers* about two miles east of the Agulhas lighthouse, have been built in a natural channel between two parallel ridges of Table Mountain sandstone, running out to sea. The floor is sandy, but was originally covered with pebbles as big as a man's head. These have been removed and piled along the natural ridges of rock to leave clear pools. The end of the natural channel has been closed by two dams, and the whole basin divided lengthwise by a similar wall. The larger *vywer* is about 100 feet from shore to dam, and 50 feet across. The smaller measures about 50 feet square, as the beach slopes more steeply there. The site was visited at half-tide. The walls are kept in repair by a local fisherman who has erected his hut nearby. His father used it before him. A second pair of *vywers*, somewhat broken down, and useless today, was seen half a mile further east, but was not visited (PLATE II).

ARNISTON. The village of Arniston is built on a headland of recent consolidated dune, cemented by lime. A small bay divides the European village from the coloured fishing settlement, similarly situated on a dune headland. This latter promontory has a pair of *vywers* situated on each side of it. The western pair are built in channels between rock, and in this resemble the examples at St. Mungo Bay and the larger series at Slang river. In contrast the eastern pair has been built out from the flat sandy beach in two loops coming together to form a figure 3, with the open mouth to the beach. The most striking observation to be made here is that the lime-cemented dune of the cliff

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has been used for the walls (PLATE III), and has since blackened and cemented itself into a solid trellis of stone that permits water to pass freely through the interstices, but is immovable. This suggests very considerable age. There is no sign of these fish-traps being used today, though they are in excellent condition.

SKIPSKOP. Half a mile east of the deserted village of Skipskop is a single large *viskraal*, almost covered by the tide when we visited it. This is the largest example I have seen, and has no central dividing wall. The plan is a semi-circle, with the diameter opening on to the beach, measuring 200 yards, and running perhaps 100 yards out to sea. The walls have the appearance of being higher and better built than the others, and judging from the slope of the beach, may even be 4 or 5 feet high at the outer edge. The shore is sandy, and there is no indication of any suitable source from which the stone might have come. Opposite the *vywer* is a large open area of tidal lagoon, swept only by the highest tides, and showing remnants of midden about its edges and scattered over the floor (PLATE IV).

A mile east of Skipskop is a pair of *vywers*, the largest pair observed on this coast. The outer wall, built on sand, and cemented firmly by natural processes, consists of a vast semi-circle, 200 yards wide at the shore, and 100 yards or more to the outer wall. This is divided into two fairly equal parts by a single radial wall. The dam is about two feet high at the shore, and must be very much higher as the water deepens. Once again the neighbouring shore is covered with midden between the sand-dunes.

KOGEL BAY. Below the steep, almost precipitous, slope from the Steenbras mountains to the sea, west of Cape Agulhas, a pair of *vywers* was observed. They are of rounded pebbles and boulders, built between rocks on a sloping sandy beach, and are in bad repair.

STILL BAY. At this site, near the mouth of the Kaffir Kuils river, south of Riversdale, the *vywers* are still in use, but are obviously far older than the fishing settlement there. They are roughly built walls enclosing pools of sea-water, between standing rocks. The floor of the trap is sometimes ground-baited, but this does not seem essential, as some varieties of fish feed inshore at certain times.

Dr C. H. Heese, of Riversdale, has taken considerable trouble to search these *vywers* for implements, and has found material attributable to various periods, the oldest being of Stellenbosch culture (comparable with the Chelleo-Acheulian of Europe). Such evidence is of very little value, and cannot be used for dating the traps. It is however certain that the traps have been used for many centuries, and it may be possible to relate these with the Wilton middens at the Kaffir Kuils river mouth. As elsewhere the stones have been cemented by time, water and shell-fish.

KOSI BAY (Zululand coast). I have been unable to see these *vywers*, but have been informed that here again fish-traps are in use today, in this case by Bantu peoples, mainly remnants of Zulu or other Natal tribes. From photographs, the area covered seems to be immense, and appears to be associated with the mouth of Kosi Bay, and not with the open beach.

BERG RIVER MOUTH. Here again I have no exact information, but examples are known to exist in St. Helena Bay.

FISH AND FISHING

Mr Pike, on a subsequent visit to the Gouritz river site, was able to get further information from the local people concerning the earlier fishing along this coast. He writes, 'One of my (coloured) boys who was born in these parts, and who has fished here for

many years (and who, unlike many of the coloured folk, seems to have taken notice of things around him), tells me that years ago a fisherman found stuck away in a hole a fishing line made from a certain wild vine of fibrous texture. This had been shredded and turned into fishing line, and the hook was a bone tied in the middle and sharpened on each side'. This is curious, as no such bones have yet been observed from midden deposits, though why we should expect them to be discarded in the home rather than lost at sea, I do not know.

Discussing the varieties of fish caught today in the *vywers* here, Mr Pike goes on: 'The most common fish we come across is the Blacktail, which at certain times of the year frequents the shallows among the round stones in thousands . . . Then you get the Harder (*Mugil cephalus*) which comes in during the winter months in great numbers. Then there are young Stompkop or Mussel-crackers (? *Sparus gibbiceps*) but they are usually found in deeper waters. The Kabeljou (*Johnius hololepidotus*) is usually found on sandy bottom, and does not seem to be a great lover of rocks. I have never caught one here, but only in the Gouritz river mouth, so I think you can rule this out. But what do come here in great numbers during a southeast wind are sharks, and we have even caught them in the old *vywer* when the water was high during a spring-tide.

'The harders are surface fish and are easily killed with a stick or a piece of fencing wire. The Blacktail is a very different proposition, as they are very shy and quick'. He adds that Sea-cats (Octopus) are very frequently found in the *vywers*. These are used as 'white-bait', or are frequently eaten by the local fishermen.

The very wide distribution of these *vywers* does not coincide with the cultural area of any one people today. In the south the coast provided the grazing-ground of various Hottentot tribes, and is still inhabited by their descendants who have turned fishermen and are generally accepted as 'Cape Coloured', as the term Hottentot is derogatory. In contrast, the eastern side of the Union is peopled by Bantu tribes who have been there for more than 300 years. About Kosi Bay they eat fish, but further down the coast they have only recently come to regard fish as even edible. Unluckily I have no evidence yet from the area in which fish were not eaten by the Bantu.

In general they are built at suitable points along the coast, and the two methods employed seem to be similar everywhere: some are built of rock on shelving beaches, others are cleared spaces between standing rock, banked up with local pebbles. In all instances the traps are related to midden sites. At Humansdorp they are associable with the older midden, but not with the most recent site. This latter can be accepted as having been made by the Damaqua tribe who lived here two centuries ago.

Many *vywers* are still in use, and ground-bait is used, suggesting that we are in the presence of something more than a 'locality tradition'; that ground-bait was used by the original builders, and the idea handed on. It is more than probable that the present fishermen along the southern coast are the actual descendants of the original people and retain certain traditions. They certainly maintain, and may even construct, fish-traps.

At Oakhurst and elsewhere it is possible to date the beginning of inshore fishing with some accuracy. It coincides here with the beginning of the Wilton period. The *vywers* are certainly Wilton and post-Wilton in date.

The building of the larger examples suggests considerable cooperation, but a small one, made from local beach-pebbles, can be undertaken by one man quite easily. A knowledge of tides is by no means surprising.

As to their ultimate origin, nothing can yet be said. It is possible that this is an adaptation of the very common African reed-trap made in rivers throughout the continent.



NEAR VIEW OF TIDAL FISH-TRAPS, SLANG RIVER, HUMANSDORP

PLATE II



NEAR VIEW OF 'CLEARED PEBBLE-BEACH' TYPE OF TIDAL FISH-TRAP, ST. MONCO BAY, CAPE ACULHAS. SHOWS TWO UNEQUAL TRAPS



TIDAL FISH-TRAPS, ARNISTON, AGULHAS COAST
The recent headland of sand cemented with lime can be seen in the background



LARGE DOUBLE TIDAL FISH-TRAP, EAST OF SKIPSKOP, AGULHAS COAST

The largest so far noted. This is of the '3' type

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One thing is certain—the idea could not have come from the Mediterranean, as the traps depend entirely upon tides for their working. This does not preclude a spread about the Atlantic or the Indian Ocean coasts.

We may finally draw attention to the presence of analogous fish-traps in Australia (4).

NOTE.—These South African fish-traps may be compared with the medieval fish-weirs on the English coasts. There were three such on Southampton Water, near that town, two belonging to the town and one to Godshouse (Queen's College, Oxford). The latter is described, in an early 13th century document, as the fishery (*piscaria*) called 'novus gordus de Depeden'. The word 'gordus' is defined by Ducange as an enclosure for catching fish. The same things are also sometimes called 'gurgites', the word also used for mill-ponds. They were constructed on tidal mud-flats, probably of hurdles and brushwood, operating in the same way as the stone walls described above. Remains of stone walls are to be seen on the shore near Minehead and in the Scilly Isles; and it now seems possible that these too were fish-traps. If so, the conclusions reached in my article 'Lyonesse' (*ANTIQUITY*, 1927, 1, 5-14) will not hold good.—O.G.S.C.

⁴ Klaatsch : *Werdegang der Menschheit und die Entstehung der Kultur* (Berlin, 1932).

The Role of Birds in Early Navigation

by JAMES HORNELL

IT is not generally recognized how important a part was played by birds in the guidance of early voyagers when sailing on the uncharted seas of the ancient world, and how their regular migrations year by year and season by season, along definite routes have contributed to the discovery of many lands and isolated islands. We know that Columbus made his first American landfall by noting the south-westerly direction taken by great flocks of small field-birds seen flying overhead in the evening towards land as yet out of sight of those aboard the ships; we know, too, that the significance of their flight was at once recognized, for did not Pinzon point out its meaning to his crew by his remark 'Those birds know their business' (Morison, 1841, 664-5)?

How true his words were we now know, for it is about the time of year (October) when Columbus saw these battalions of birds darkening the sky, that certain species of landbirds set out from the eastern shores of North America by a southerly route, via Bermuda, to seek a warmer climate and a more plentiful supply of food.

In the biblical narrative of the Flood, borrowed without doubt from a still older legend current in Babylonia, we learn that when the torrential rain moderated and the waters began to subside, Noah sent out bird scouts to discover whether any uncovered land was anywhere to be found. According to the bible story the first bird to be liberated was a raven which went to and fro the ark in its vain search for trees and dry land. Seven days later Noah tried again, this time setting free a dove; after a while she, too, returned having found no place for the sole of her foot. After the lapse of another seven days Noah again sent out the dove and this time she returned in the evening with a leaf freshly plucked from off an olive tree (*Genesis*, VIII, 11). A week later the dove was sent out a third time; failing to return, Noah concluded that some high ground was at last uncovered by the flood waters.

Various versions are current relating to the same incidents. Among these the following are typical:—

(a). In the Shirazi colony in Zanzibar, descendants of Persian immigrants from Shiraz, a story is told of how, when the ark first touched bottom, Noah sent out a raven to spy out the country (in consequence of this, the raven is often referred to by Arabs and Persians as 'Noah's crow'). But the bird misbehaved grievously by feeding upon dead bodies floating amid the waves; when at last it was surfeited it returned to the ark where it was violently sick. Noah was furious; he cursed the bird and reviled it for its disgusting conduct. As a punishment he decreed that its cry, ever after, should be the same as that which it made when it vomited. Hence the raucous cry of this bird! (1).

Disappointed with the result of liberating the raven, Noah on the next occasion liberated a dove; when, as in the biblical narrative, it brought back an olive branch, he knew that land was near and prepared to ground the ark and land his family and all the animals aboard.

¹ This curious version was collected by the late Mr Ian Rolleston, and communicated to me shortly before he was killed by a crowd of riotous Zanzibaris whom, unarmed, he was endeavouring to pacify.

THE ROLE OF BIRDS IN EARLY NAVIGATION

(b). Probably the earliest version is the Babylonian account discovered by George Smith. According to this, Noah or his prototype sent forth a dove on the first occasion ; as stated in the biblical story it found no resting place and returned ; next to be sent out was a swallow, again with like result. Finally a third bird was released, a raven this time ; it flew away and perceiving trees emerging from the waters it did not return (Delitzsch, 1901, 535-549).

(c). Even among the islands of Oceania a variant of the story is found. Fornander (1878, 65) gives a Samoan creation myth which relates that 'Tangaloa, the Great God, sent his daughter in the form of a bird called *kuri* (the snipe) to look for dry land. She found a spot and as it was extending, she visited it frequently. (2). At one time she brought down some earth and a creeping plant. The plant grew, decomposed and turned into worms and the worms turned into men and women'.

We see, therefore, that these deluge stories, particularly those related in the sacred books of those religions which originated in the Middle East, in Palestine, Arabia and Iraq, afford very early confirmation of the accounts of the old-time use of birds by voyagers who had the hardihood to venture out of sight of land when sailing in the open sea and were uncertain from time to time of their position in relation to the nearest land mass or island.

The earliest definite reference to this primitive help in navigation which I can trace is the legend found in the Hindu *Sutta Pitaka*, attributed by Rhys Davids (1899, 432) to the fifth century B.C. ; this tells of how Hindu merchants when sailing on oversea voyages were accustomed to carry with them several 'shore-sighting birds' to be used to locate the nearest land when the ship's position became doubtful. The same custom is mentioned by Pliny (*Nat. Hist.* vi, 22), as practised in his time (first century A.D.) by the seamen of Ceylon when making sea voyages, as they were unable to steer by the stars.

The fullest account occurs, according to Rhys Davids (*loc. cit.*), in a passage in the Dialogues of the Buddha found in the Kevaddha Sutta of Digha, written about the fifth century B.C. In this the Buddha says :—

'Long ago ocean-going merchants were wont to plunge forth upon the sea, on board a ship, taking with them a shore-sighting bird. When the ship was out of sight of land, they would set the shore-sighting bird free. And it would go to the East and to the South and to the West and to the North, and to the intermediate points, and rise aloft. If on the horizon it caught sight of land, thither would it go, but if not, it would come back to the ship again . . .'

Rhys Davids continues :—

'Cosmas Indicopleustes found the same custom in Ceylon in the sixth century A.D., merchants depending on shore-sighting birds instead of observations of the sun or stars'.

The same author mentions that 'the Institutes of Manu include rules for the guidance of maritime commerce' and adds :—

'The passages quoted indicate a well-developed and not a primitive trade. The sea-trade was principally of Dravidian development, while both the Vedas and the Buddhist writings are of Aryan origin, and refer to things new to their race but old in the world'.

But the most notable instances of the utility of using birds as ocean pilots are to be found in the results obtained in this way as the outcome of some of the long exploring

² For numerous other variants, see Sir J. G. Frazer's *Folk-lore in the Old Testament* (1918), and R. Andree's *Die Flutsagen* (1891).

voyages undertaken by Polynesian adventurers, before these ceased about the fourteenth century of our era. These intrepid navigators, voyaging in double canoes well provisioned and equipped, and confident in their ability to direct their course and in particular their return home, by intimate knowledge of the stars, the run of the sea, the seasonal winds, the smell of the land and the indications afforded by the clouds which hang over islands and land masses, appear to have been extremely careful observers of the movements of migratory flocks of birds, year in and year out, travelling in definite directions. From these movements they deduced that in the directions indicated, wooded and hospitable lands must lie; this in turn led to the organization of voyages of discovery in the confident belief of successfully finding the land whereto the birds were seen to be directing their seasonal flights.

Cartwright (1929, 105-121) shows good reason to believe that Polynesian navigators hailing from Tahiti or from Raiatea in the Society Islands, succeeded in discovering the Hawaiian Islands after marking over a long succession of years the regular seasonal arrival in the Society Islands of flocks of golden plovers from a northerly direction. These birds as we now know, breed in Alaska and the adjacent northern coast of north-eastern Siberia; in the autumn they migrate southwards. Those which breed in Alaska pass along the Aleutian chain of islands and thence pursue a southerly route which leads them to the Hawaiian Group and thence via Fanning, Christmas and other of the Line Islands onwards to the Society Islands and the crowded archipelago of south-eastern Polynesia.

The other contingent, comprising the birds bred in northeast Siberia, follow a route which takes them either through Kamschatka and southern Japan and thence to the Philippines and Moluccas, or else travel coastwise through Siberia, Korea and China to the Indo-Chinese peninsula.

The sailor-folk of the Society Islands would naturally reason that if birds could fly to this group from some distant land, they, in a large and well-found double-canoe could certainly sail to the land whence the birds came. When once they had proved this conclusion to be correct, still closer observation of bird migrations would be taken; other bird-blazed routes would be studied and followed by adventurers sailing in double-canoes; by these means many more islands would be discovered and the routes thereto recorded.

Apart from the discovery of the Hawaiian Islands by the people of Tahiti or of Raiatea (or conversely of the discovery of the Society Islands by the Hawaiians), through knowledge acquired by watch kept upon the migration of birds, the most important result flowing from acquaintance with the import of bird migratory movements was the discovery of New Zealand by Kupe the Raiatean. According to Smith (1921, 216) 'Kupe had observed in his many voyages the flight of the *kohoperoa* or long-tailed cuckoo, year after year, always coming from the southwest and wintering in the Central Pacific islands. He and his compeers would know at once that this is a land bird and consequently that land must lie towards the southwest. By following the course preserved in the Maori College from his time, viz.: 'In sailing from Rarotonga to New Zealand, let the course be to the right hand of the setting sun, moon, or Venus, in the month of February', he would certainly strike New Zealand. This course is quite right, as any one may prove for himself by trying it on a chart'.

Besides taking advantage of the knowledge gained from study of the routes of migratory birds, the Polynesians have been credited with the training of certain birds to a degree exceeding even the feats of carrier pigeons in modern times. Smith (1921, 230) gives a traditional instance: 'Toi's grandson Whatonga, sailing from Tahiti, lost

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his way in a fog and landed on Raiatea. After some years' [?] sojourn there, Whatonga's trained bird found him and by the course the bird took on its return with an answer (by quipus or knotted cord) the wanderers discovered the direction of their home'.

To go far afield for instances of the use by old-time mariners of shore-sighting birds is needless. The Scandinavian Vikings undoubtedly valued certain kinds of

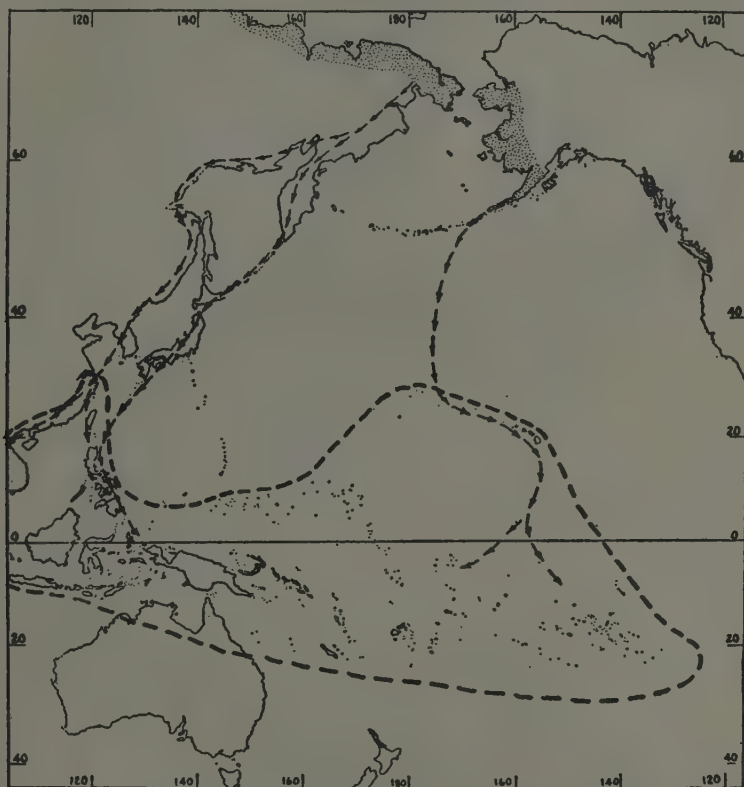


FIG. 1. MAP SHOWING THE MIGRATION ROUTES OF THE GOLDEN PLOVER FROM THE BREEDING GROUNDS (STIPPLED) IN EASTERN SIBERIA AND ALASKA

The area outlined by dashes indicates its winter home; arrows indicate the routes of migration

(From Cartwright)

captive land-birds for their ability to descry land from a far greater distance than can the human eye when close to sea level. The most notable instance is concerned with the re-discovery of Iceland in A.D. 874. The island, inhabited by a few Culdee monks from Ireland, who had sought there a haven of rest and peace some years previously, was first visited by the Vikings about the year 864, the leader being a Swede named Gardar.

In the Saga of Floki, the second Scandinavian to visit Iceland, there is a gloss dating from the time when the Saga was first committed to writing (*circa* 1225) in which it is

mentioned that Floki, previous to setting sail to rediscover Gardar's island, had performed a great sacrifice and had consecrated three ravens to the gods, which he had then taken aboard his ship in order to serve as guides on the voyage. After he had voyaged westwards for several days without sighting land, he liberated at intervals the three ravens, one at a time; the first flew back to Norway, the second returned to the ship, but the third flew ahead and did not return (Chapman, 1930). He proceeded onwards in the wake of the third raven, duly making a landfall on the southeast coast of Iceland in A.D. 874. The reason given for the employment of these ravens was that 'in the northern lands those who sailed the sea had not the load-stone' (Winter, 1837, p. 100).

Although Floki became known as 'Floki the Raven' on account of this incident, he was certainly not the only sea-rover who, in those days, made ravens, birds sacred to Odin, serve them instead of a compass. P. H. Mallet (1847, footnote on p. 188) says 'there may have been a particular brood of these birds trained and consecrated by religious rites for the purpose, which may account for the custom falling into disuse on the introduction of Christianity; the more so as the raven was the bird of Odin, the Raven-God, Hrafnagud as he is called in Scaldic poesy'. A more probable reason is that the introduction of the magnetic compass displaced the use of shore-sighting birds.

Significant light upon the probability that both Iceland and the Faroe Islands were reached on several occasion by voyagers following the migration routes of birds, is given by study of a map of Europe which appeared in the Annual Report of the Smithsonian Institution for 1892 (Palmén, J. A., 1893, 375-396). Two main routes deserve special attention.

The first (A) passes along the western coast of Scotland and thence onwards to Iceland via the Faroe Islands. This track would be struck by Scandinavian ships sailing westwards from Norway. By it, sailors from Scotland and Ireland would be piloted direct to the southeast coast of Iceland; probably this was the course taken by the Culdee priests sailing in curraghs to Iceland—the first settlers in that island. Dicuil, an Irish monk of the ninth century, expressly states in his *De mensura urbis terrae* that both the Faroes and Iceland were discovered by his countrymen (Mallet, 1847, 189).

The second migratory route (B) runs from the north of Scotland direct to the coast of Norway, reaching there in the vicinity of Molde and Christiansund. Sailing by this route would facilitate communication between Scotland and Norway during the migration season; afterwards when the route had been proved in this manner, the experience gained of distances to be run in certain directions and times, when sailing under favourable conditions of wind and sea, would enable voyagers to dispense with the guidance of birds, particularly if the vessels sailed in company with the units arranged on an extended front after the habit of the old-time Polynesian explorers.

The foregoing instances are sufficient to demonstrate what useful aids birds were to early navigators unprovided with the magnetic compass and how important they have been in the discovery of new lands. In later times during that restless period between the fourteenth and the nineteenth centuries when Portuguese, Spaniards, Dutchmen, Frenchmen and the British were rivals in pursuit of overseas discovery, the flight of birds was equally important. Thus we read in the instructions drawn up by Pedro Fernandez de Quiros for the guidance of his officers during his voyage in 1606 for the discovery of the Austral Regions (Hakluyt Soc., vol. xiv, Ser. II, vol. 1, p. 187):—

'If flocks of many sea birds are met with, such as boobies and petrels, note should be taken of the direction in which they fly, and whence they come in the morning; noticing whether they assemble early and return late, for then they are far from land; but if they assemble late and return early, the land is near. If they are

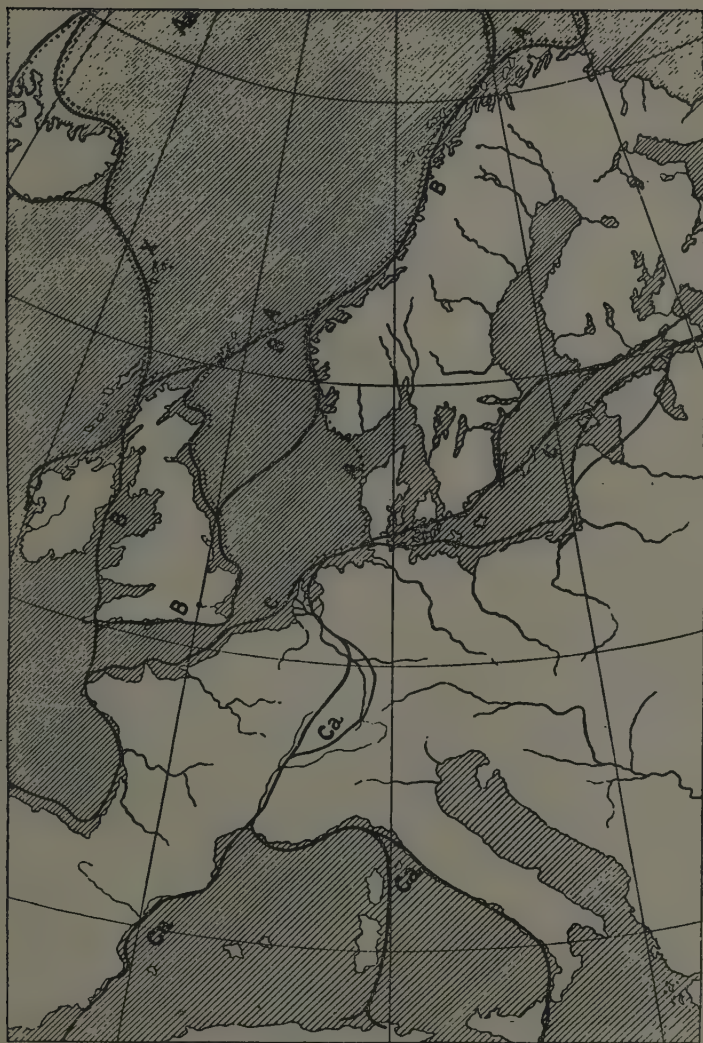


FIG. 2. MAP SHOWING THE MAIN MIGRATION ROUTES OF LITTORAL BIRDS
(EXCEPTING THE FLUVIO-LITTORAL) IN EUROPE
(From Palmén)

not seen to assemble, and are heard to make a noise at night, and are still to be seen at dawn, then either land is very near or the birds have slept on the sea. It is to be noted that these birds almost always frequent islets or rocks, because they are nearer their fishing grounds. For this reason there should be vigilance to avoid shoals.

If the birds that may be met are *piqueros*, ducks, widgeons, gulls, *estopegados*, terns, sparrowhawks, flamingos or *siloricos*, it is a sign that the land is very near; but if there are only boobies, so much care is not necessary, because these birds are found far from land, and the same may be said of boatswain birds, which fly where they please. Moreover, if all the birds, or part of them, fly together, it is sign of proximity to land; and it should be noted whether some of the birds fly as if wounded, seeking land on one or the other side'.

Somewhat similar instructions were given by teachers in the navigation schools formerly carried on in the Gilbert Islands, to the leaders of crews about to set sail on long and perilous voyages.

According to Grimble (1921, p. 128) the instructions included the following guidance:—'Having set out on his voyage and dropped the land, the navigator will keep his eye on the birds. If he lose sight of these, he knows that no land is near. But if, after a long voyage, he meet a flock of gulls which mount high in the air and cast about to different points of the compass, he will steer in the direction they ultimately take, for that way lies *terra firma*'.

We have already noted that Columbus made his first landfall in America by his decision to alter course to the southwest because of the great flights of small land birds which he noted flying in that direction. Morison (1941, 644-5) adds the remark that Columbus did this 'because he remembered that the Portuguese had discovered the outer Azores by attending to the flight of birds'. Morison remarks that this judgment was sound, for the fall migration of North American birds to the West Indies, via Bermuda, was then in full flight.

The discovery of Brazil may also be credited with justice to the pilotage of birds, for on the morning of April 22 of the year 1500, Pedro Cabral having taken an unusually wide westerly course when on a voyage to India, sighted birds of the kind called *furobuchos*; taking this as a sure sign of nearby land, he sailed onwards in the direction indicated by the birds and in the evening came in sight of the coast of Brazil (Prestage, 1933, 277-8).

Several instances are also on record of the usefulness of bird flights in the guidance of travellers in trackless country. In Zurara's *Chronicle of Guinea* (Hakluyt Soc., caps. 76 and 77), in the description of the adventurous journeyings of João Fernandez in the Rio de Oro country of West Africa in the closing years of the 15th century, mention is made that after he was taken prisoner by the Arabs and Berbers, the party 'guided themselves by the stars and winds as is done at sea' and by observing the flight of birds, for regular paths did not exist (quoted by Prestage, 1933, 78).

Nor must we forget the story of how Alexander's guide to the Oasis of Siwa, having lost his way, the party made the last stage of the desert journey guided by two snakes or, as another version says with greater probability, 'birds returning from the oasis'. (Tarn, 1927, 378).

Last of all is the story given by Crichton in his *History of Arabia* (1833, I, 111) that 'Solomon discovered the retreat of Belkis, Queen of Sheba, among the mountains between the Hejaz and the Yemen, by means of a lapwing which he had despatched in search of water during his progress through Arabia'.

THE ROLE OF BIRDS IN EARLY NAVIGATION

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Groups of Circles in the Silt Fens

by D. N. RILEY

CONCENTRATIONS of small circular ditches are among the most difficult to explain of the numerous remains shown by soil-marks and crop-marks in the Silt Fens. The writer first noticed a group south-east of Fifties Farm, March (Cambs.) when on a practice flight in early 1944, and then took it to be a group of barrow

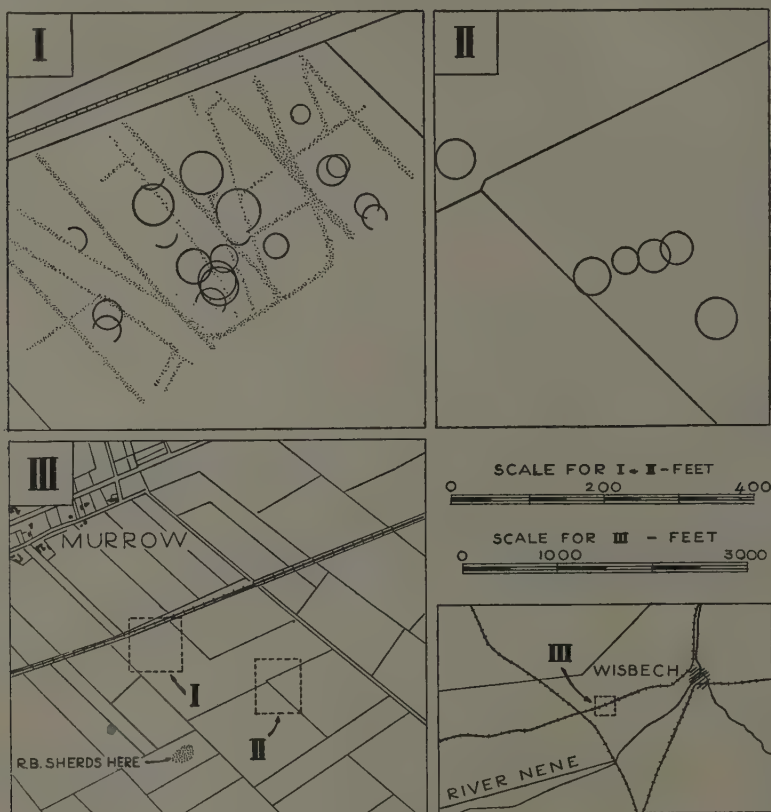


FIG. 1

circles like those known in the Upper Thames country (1) and elsewhere (2). Later experience showed that there were so many circles—up to 30 or 40—crowded together in each group and the groups themselves so numerous, that this explanation no longer seemed adequate. Twenty-two groups of circles and two isolated examples were noted,

¹ *Oxoniensia*, VIII-IX, p. 66 ff.

² *ANTIQUITY*, XIX, 146 ff.

GROUPS OF CIRCLES IN THE SILT FENS

but there must be very many more, as it was not possible to make a systematic search, nor even to keep particulars of all the sites observed. Most of the circles were shown by soil-marks.

The known sites (see list at the end of this note) have been plotted on a map (FIG. 2), which also shows the areas where remains of early settlement, probably Romano-British, are seen from the air. The distribution of the circles and the early settlements is so similar that a connexion seems possible.

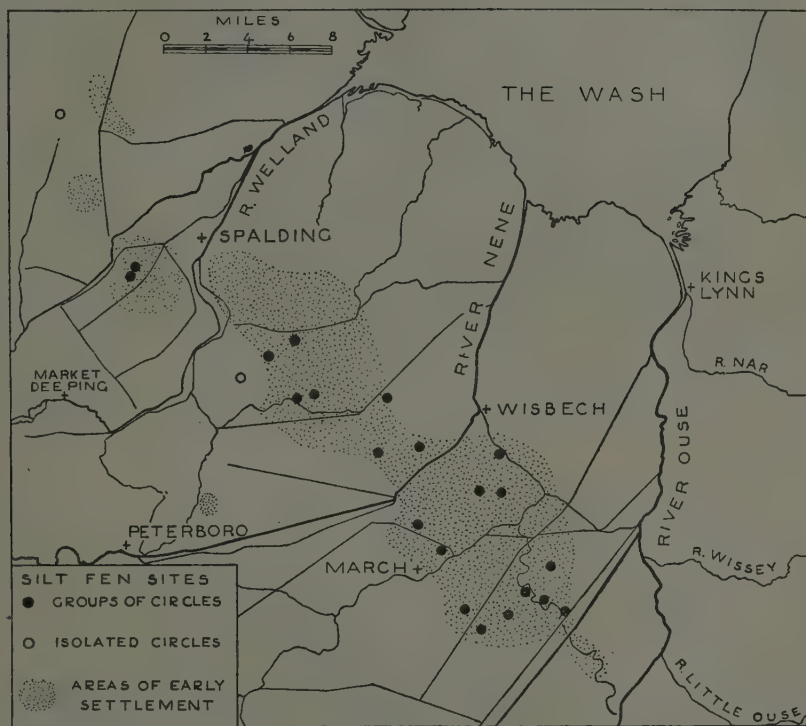


FIG. 2

The only site the writer was able to photograph (PLATE facing p. 152 and FIG. 1) was that near Murrow (Cambs.). The circles here, which showed as grey marks in the yellowish soil of a ploughed field, were between 30 feet and 55 feet in diameter and the marks about 1 foot wide. There were several intersecting circles, a prominent feature of several of the other groups. The photograph also shows a number of straight ditches, probably dug in connexion with drainage work at different dates. No relationship can be seen between the circles and other ditches.

An inspection of the Murrow site was made on foot, but no clues were found to the origin of the circles. The surface was devoid of relics of any kind and the ground was level. A similar negative result was obtained when visits were made to groups of circles at Wimblington, Cambs. (no. 19 in list) and Elm, Cambs. (no. 13), though it may perhaps

be significant that all three were near Romano-British occupation site, for example the area scattered with R-B sherds marked in FIG. 1 (3).

The Elm group also included a double concentric circle of much the same size as the single circles, and several long, straight-sided ovals approximately 50×150 feet in size. The double circles are reminiscent of double ditches remaining from barrows, and the ovals of the long enclosures found in some Dutch urn-fields, though the likeness may well be superficial.

The soil-marks of the Silt Fens are clearly formed by dark peaty soil from the ditches of old earthworks of the type seen in pastures which have escaped the ploughing-up campaign. The circles discussed in this note were therefore presumably caused by concentrations of small circular ditches, but the writer saw no earthworks of this description in the Silt Fens except for two (possibly four) small barrows, the positions of which are given in the appended list. Outside the Silt Fens, however, in a meadow on the fen island of Chatteris, is a group of six shallow circular ditches between 27 and 33 feet in diameter. Two of the ditches intersect like those in the groups of circles shown by soil-marks. Ditches of this type, which could well be the origin of the soil-marks, may remain undiscovered in some fen meadows; those at Chatteris were only noticed in very favourable conditions of low sun. Beyond the area known to the writer, Phillips has recorded small circular ditches near Skegness (4).

The purpose of the circles is unlikely to be settled without excavation. Present day activities could not have caused them and several different explanations have been proposed to account for their formation in earlier times, including burial places (e.g. the groups of circles in Dutch urn-fields (5)), hut sites (though in this case one would have expected to find pottery on the surface), and various kinds of agricultural activity.

SITES

(A) Small circles shown by soil-marks and crop marks.

1. POINTON, Lincs., $52^{\circ} 52' 12''$ N, $0^{\circ} 18' 35''$ W: single circle.
2. SPALDING, Lincs., $52^{\circ} 46' 0''$ N, $0^{\circ} 14' 10''$ W: group of 15-20 circles.
3. " " $52^{\circ} 45' 37''$ N, $0^{\circ} 14' 25''$ W: approx. 5 circles.
4. POSTLAND, Lincs., $52^{\circ} 41' 23''$ N, $0^{\circ} 5' 42''$ W: single circle.
5. " " $52^{\circ} 42' 20''$ N, $0^{\circ} 5' 0''$ W: several circles.
6. " " $52^{\circ} 42' 52''$ N, $0^{\circ} 3' 0''$ W: several circles.
7. GEDNEY HILL, Lincs., $52^{\circ} 40' 50''$ N, $0^{\circ} 1' 40''$ W: several intersecting circles.
8. " " " $52^{\circ} 40' 30''$ N, $0^{\circ} 3' 10''$ W: several circles.
9. PARSON DROVE, Cambs., $52^{\circ} 40' 30''$ N, $0^{\circ} 3' 45''$ E: several circles including one double concentric circle.
10. MURROW, Cambs., $52^{\circ} 38' 30''$ N, $0^{\circ} 3' 0''$ E: group of circles, several of which intersect, and smaller group short distance to SW (FIG. 1 and PLATE opposite).
11. WISBECH ST. MARY, Cambs., $52^{\circ} 38' 35''$ N., $0^{\circ} 5' 20''$ E: large group of circles, including one double concentric circle.
12. ELM, Cambs., $52^{\circ} 38' 0''$ N, $0^{\circ} 11' 5''$ E: many circles and one large oval.
13. " " $52^{\circ} 36' 25''$ N, $0^{\circ} 9' 35''$ E: many circles, some intersecting, one double circle, and several ovals.

³ Information supplied by Mr E. J. Rudsdale of Wisbech Museum.

⁴ *Arch. Journ.*, xc, 98.

⁵ e.g. those published in *Oudheid. Meded.*, xiv (1933), 26 ff. and xvii (1936), 38 ff.

GROUPS OF CIRCLES IN THE SILT FENS

14. ELM, Cambs., $52^{\circ} 36' 25''$ N, $0^{\circ} 11' 5''$ E : many circles, seen as crop-marks.
 15. " " $52^{\circ} 35' 10''$ N, $0^{\circ} 5' 40''$ E : many circles, some overlapping.
 16. UPWELL, Cambs., $52^{\circ} 35' 12''$ N, $0^{\circ} 14' 45''$ E : two circles.
 17. MARCH, Cambs., $52^{\circ} 34' 10''$ N, $0^{\circ} 6' 50''$ E : many circles, some overlapping.
 18. " " $52^{\circ} 31' 50''$ N, $0^{\circ} 8' 30''$ E : many circles (approx. 30-40), one pair overlapping.
 19. WIMBLINGTON, Cambs., $52^{\circ} 30' 45''$ N, $0^{\circ} 9' 24''$ E : 20-30 circles, about 30-40 feet diameter, on bank of silt by old stream bed.
 20. MANEA, Cambs., $52^{\circ} 31' 30''$ N, $0^{\circ} 11' 20''$ E : many circles.
 21. WELNEY, Norfolk, $52^{\circ} 32' 45''$ N, $0^{\circ} 13' 0''$ E : about 30 circles, some overlapping.
 22. " " $52^{\circ} 32' 10''$ N, $0^{\circ} 14' 0''$ E : large group of circles, seen as soil marks and later as crop-marks.
 23. " " $52^{\circ} 31' 30''$ N, $0^{\circ} 15' 0''$ E : several circles.
 24. " " $52^{\circ} 33' 30''$ N, $0^{\circ} 14' 10''$ E : several circles.
- (B) Small circles remaining as earthworks.
1. CHATTERIS, Cambs., $52^{\circ} 26' 30''$ N, $0^{\circ} 5' 15''$ E : six circles, two overlapping.
- (C) Small barrows.
1. WELNEY, Norfolk, $52^{\circ} 32' 6''$ N, $0^{\circ} 13' 7''$ E : one.
 2. MANEA, Cambs., $52^{\circ} 31' 45''$ N, $0^{\circ} 11' 55''$ E : one.
 3. GEDNEY HILL, Lincs., $52^{\circ} 40' 25''$ N, $0^{\circ} 2' 17''$ W : two barrows probably shown on photograph by Major Allen (ANTIQUITY, XIX, pl. II and p. 153).

Racial Contexts of Prehistory

by P. K. JOHNSTONE

THE RACES OF EUROPE. By Carleton Stevens Coon. Macmillan, 1939. pp. 739, 46 plates, 9 maps, indexes, bibliography, glossary, appendix of craniometric statistics. 7 dollars (£1 15s.)

THE outstanding single fact revealed by modern ethnological research is the widespread persistence and re-emergence of ancient breeds of man. The great conquering peoples of recorded history; from Hellenes to Slavs, have faded from the racial map, while the men of Maglemose, of Bränn, and of the Swiss lake-dwellings remain. In fact, a map, such as Coon furnishes, of the present distribution of European races, must have far more in common with that of the Mesolithic or early Neolithic than most of the intervening periods. While many explanations of this undeniable fact have been offered, the simplest is perhaps the most reasonable; a race of conquerors tends to spread itself too thin. For when we turn from masses of population to single individuals it is not hard to find men and women whose precise physical counterparts thronged the bull-ring at Knossos, worshipped at Stonehenge when the gray sarsens were newly cut, or held a shield beside Vercingetorix, Alaric or Alexander Nevsky.

In view of the enormous complexity of the subject, one is apt, when confronted by a single volume no matter how sumptuous, the work of a single author, which attempts to trace in detail the racial history of an area extending from Norway and Ireland in the northwest to Baluchistan and Ethiopia in the southeast, from pre-glacial times to 1939, to feel that the author has attempted to do too much. In the present case, closer study leads to the conclusion that he has succeeded beyond all reasonable expectations.

This book may be considered in three aspects. In the first it is a quite adequate text-book of physical anthropology. In the second, as a racial gazetteer of Europe, it supersedes all previous studies, including W. Z. Ripley's monumental work of the same title (1899). Dedicated to Ripley's memory, the present book is intended as a successor. It is, however, in no sense a modernization of Ripley, being a completely new book, but its third aspect, while more controversial, is probably of major interest to readers of *ANTIQUITY*. It is the reconstruction, in racial terms, of Europe's pre- and proto-history. The originality, as well as the speculative nature, of this large section, can hardly be over-emphasized. While more conservative anthropologists may deprecate so large a proportion of theory in a work intended for classroom use, the very full presentation of statistical material on which it is based leaves the reader free to check and possibly emend the views expressed to his own satisfaction. Moreover, the speculative passages are presented very frankly as such. It is a cheerful, objective, undogmatic book, fully aware of recent discoveries in the related fields of archaeology and linguistics.

The author, Assistant Professor of Anthropology at Harvard University, is a disciple and junior colleague of the famed, belligerent and pessimistic Dr E. A. Hooton. While obviously owing a great deal to Hooton, Coon is no mere reflection of his senior's views. He shares Hooton's dry humour, but not his bitterness or his crusading fervour. As a member of Harvard's staff, Coon has done field-work in North Africa, Ethiopia, Arabia and the Balkans, often leading to unorthodox conclusions. But he has also digested a truly enormous mass of printed material.

The photographic plates of racial types are copious, well chosen and clear. The maps are also praiseworthy, especially those relating to Neolithic, Bronze and Iron Age

folk-movements, and that show the modern racial situation. Those on stature and coloration tend to confirm the earlier maps of Ripley and Beddoe (1), often unduly disparaged. Where they disagree, it is seldom possible to evaluate their relative reliability, due to an unfortunately ambiguous system of documentation on Coon's part. It is to be presumed that in most, if not all cases, his maps are to be preferred, but there are cases where a reservation of judgment seems logical. This refers mainly to Great Britain itself, which suffers in comparison with Ireland, where Coon has benefited by use of the (still unpublished) material collected by the Harvard Anthropological Survey, which among other things, took detailed observations and measurements of 10,000 adult Irish males. Similar large-scale surveys in England, Scotland and Wales would be of fully equal interest, for while the larger island contains fewer early types (?), its more diversified terrain probably has produced more local concentrations of distinct types.

Coon accepts the Galley Hill and Swanscombe fossils as ancestral to the later Mediterranean types, although the region in which they survived the final glaciation has still to be found. Neanderthals are credited with the invention of clothing, which made possible a northward extension of their hunting range. The later Cro-Magnons are treated as Neanderthal-*sapiens* hybrids (2). Several races were incipient in the Cro-Magnon mixtures. The large-headed epipalaeolithic dolichocephals of MacArthur's Cave and Stangenäs, often regarded as proto-Nordics, are treated as a distinct 'Brünn' race, which survives mainly in west Norway and Ireland. A broader-headed type, which apparently flourished in Mesolithic times, is appropriately named for the Borreby skull, since these tall and rugged brachycephals, usually, though not invariably blond (those of Fehmarn, quite dark, remind one of Max Schmeling), are found most unmixed in the islands of the western Baltic. In diminishing purity, it extends to the frontiers of France, where it merges into the less rugged Alpine type, here classified as 'foetalized' palaeolithic survivors of the Central Highlands. The Albanians, tall and large-headed, probably represent another mountain refuge, as do Irish-looking tribesmen of the Riff.

The Neolithic 'Swineherd culture' which reached Britain as that of Windmill Hill, survived almost to modern times in the Canary Isles—where Coon demonstrates that the Guanches were 'exterminated' only in a cultural sense. Coon accepts the theory of Megalithic diffusion from the Mediterranean by sea, and connects it with the distribution of a taller, 'Atlanto-Mediterranean' type, often blue-eyed, which is the dominant type in British Long Barrows, and is traceable in modern Wales and southwest Scotland. The Windmill Hill peasantry appear to have been largely excluded from the privilege of barrow burial, but Coon finds their descendants in true Mediterraneanans numerous in Wales, the Pennines and the Forth-Clyde valley. The Peterborough and Skara Brae folk make no distinct appearance in this analysis. One wonders if they, being northern Forest-folk, were not more or less blond, and if the east-west cleavage in British coloration did not begin with the Neolithic influx.

Beaker crania analyzed by Coon present a 42 per cent Borreby—33 per cent Bell Beaker—25 per cent Battle-axe blend. Since no distinction is made between A and B Beakers, we can only surmise that the Battle-axe or Corded element was strongest in the later contingents. But it probably gives a fair idea of the mixed invaders. Modern crania of similar characteristics from east and northeast Scotland (chiefly Fife) seem to

¹ J. Beddoe, *The Races of Britain*. London, 1885.

² It is equally possible that *sapiens* man, being an offshoot from the earlier, less specialized, Neanderthals, was himself a carrier of Neanderthal traits. See W. E. Le Gros Clark, 'Pithecanthropus in Peking', *ANTIQUITY*, xix, especially pp. 4-5.

prove that the later Picts were, to a large extent, Bronze-age survivors (3). The Corded element is of special interest, since many authorities see in them the primeval Indo-European (why not 'Wiro'? The alternative terms are all either long-winded or ambiguous) conquerors. This is not Coon's view. Following Nehring, he makes the Corded men speakers of proto-Altaic, and finds traces of their peculiar physique among modern Iranians, Afghans and Turks. They are a Mediterranean sub-type, tall (5 feet 11 inches), extremely long-headed (cranial index 72.5) with high cranial vaults (average 146.5 mm.) and long, narrow faces. In the Danube valley, by mixing with the (already Indo-European speaking) Danubians, these Corded folk became ancestors of the true Nordics, who spread from Central Europe. It would seem more economical to connect the Corded men with the introduction of the Uralic 'Element A' and the Danubians with (?Caucasic) 'Element B', thus connecting the mixed language with the mixed race. But beyond this, one is inclined to wonder if there is not a closer connexion between the Battle-axe wielders and the palaeolithic longheads of north Europe than Coon will admit. Middle Bronze-age barrows in Esthonia have yielded the bones of men who unite 'Brünn' and 'Corded' traits. Coon is forced to regard these as hybrids, but they might be used to suggest a genetic linkage. The 'Nordic' and 'Aryan' problems are further complicated by the existence of still another type on the steppes of east Europe and west Asia, which is no less Nordic than the Corded-Danubian hybrids and is always associated with 'Wiro' speech.

This, which might be called the Scythian type, is sub-mesocephalic (cranial index about 76) with a much lower cranial vault (means range from 131.6 to 135) of cylindrical profile, and a prominent, mesorrhine nose. This is the type of the historical Scyths and Phrygians. Under the smoke-screen of cremation pyres, men of this type spread westward as carriers of Urnfields cultures.

Most of the Bronze Age is racially obscure, due to the prevalence of cremation. Ireland had been dominated by Dinarics from Spain, who may have carried the Food-vessel culture to Scotland. In central Europe, the Aunjetitz culture was spread by Nordics with high cranial vaults (135.6 to 141.9) and long heads (70.9 to 73.6), of Corded-Danubian ancestry. Tumulus Culture inhumations are 70 per cent Bell Beaker Dinaric, with the dolichocephalic minority mostly Danubian.

After the Urnfield movements, the curtain rises again to disclose men of 'Scythian' racial affinities settled from Denmark to Latium, and from Poland to Ireland. These are the Latins, Kelts and Slavs of history. Coon would add the Teutons, and certainly the Merovingian Franks could be added to a series of Iron Age Celtic skulls from the Marne, Britain and Ireland, without disturbing the indices significantly in any respect. Those from Iron Age Denmark differ only in cranial index (72.3 against 76.4 for the Franks, 75.4 to 76.9 for the Kelts). The means for cranial height are especially significant, varying only from 131.6 (Irish) to 132.9 (Gallic, British and Danish). Since this type was quite unknown in Western Europe before the spread of cremation, it must be of Urnfield origin.

The locally older Aunjetitz type recurs among the Hallstatt Illyrians, the La Tène Kelts buried at Driffild (Parisii?) and among Dark Age Bohemians, and is approximated by most of the Teutons of the *Volkerwanderung*, including the Anglo-Saxons and Goths. In the Teutonic examples, Corded and Brünn-Borreby inheritances are detectable. In this connexion, it is notable that a 'nest' of very pure Hallstatt Nordics has been

³ But Pictland did not escape Iron Age invasion. See Childe, *Prehistoric Communities of the British Isles* (1940), pp. 211 ff.

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discovered by Scandinavian ethnologists, near Oslo, surrounded on all sides but the south by Corded-Brünn-Borreby-Hallstatt hybrids.

It is thus evident that the modern Scandinavians, instead of being a single, homogeneous race, are actually a blend of four or more not strikingly dissimilar types. Coon places the Hallstatt invasion of Denmark *c.* 750-500 B.C., and identifies these people (the 'Jarls' of the *Rigsthula*) with the carriers of Teutonic speech. This contrasts with the more usual view, which would trace all Teutonic peoples back to the Scandinavian Bronze-culture. Since it is now possible to cite archaeological chapter and verse in proof of such an invasion (4) the 'Osterdal folk' will have to be reckoned with in any reconstruction of Teutonic origins. But the Osterdal type is not quite that of the Danish Iron-age skulls, and geographical distribution would suggest the Danish type came in later. Were there *two* waves of invasion?

Since the Angles came from the same general region, a comparison suggests that Coon's Danish Iron-age 'examples mainly represent a much earlier period, and that by *c.* 450-500 the 'Kelto-Scythian' type had been largely absorbed or drained off by migration (e.g. that of the Cimbri and Teutones).

If the Scandinavian Bronze population had spoken a non-Teutonic language, one would expect it to survive on the northern fringes of Norway and Sweden, into medieval times (the Lapps, on Coon's evidence, are comparatively recent arrivals from northwest Asia). No such survival seems traceable. And Teutonic is both so archaic and so garbled a form of Indo-European (5) that it seems easier to regard it as the sole surviving representative of the first wave of 'Wiro' speech to penetrate western Europe. This would serve to connect it with the Battle axe invaders. The cult of Thunor points in the same direction. The Iron-age invaders would then be Illyrians or Kelts (or both) absorbed by their subjects like the Normans in France and Britain. Every dialect of the Teutonic peoples bears witness to a period of Celtic dominance, and if we knew more of Illyrian, it might be possible to trace a still earlier period of Illyrian rule.

With regard to Celtic origins, the case is somewhat different. For some years evidence tending to associate the Kelts and the Urnfield cultures, has been accumulating. The anthropological evidence furnished by Coon leaves little doubt that the true 'Celtic cradle' lies somewhere northeast of the Carpathians. Apparently the P-Keltic groups lingered behind long enough to pick up many Iranian loan-words, and the use of war-chariots and trousers, from the Scythians, who probably had a considerable influence on the emergence of La Tène art (6). Of course the Urnfields cultures were not exclusively Celtic. Besides the Latins, the Phrygians and Slavs have a valid claim to an Urnfield origin, both on craniological and cultural grounds. This suggests that the culture originated on the frontiers of *Kentum* and *Satem* speech.

In Britain, despite the fury of the earlier stages of the Saxon invasion (the description of the 'slaughter-barrow' at Dunstable (7) reads like an echo of Gildas' laments) 'the British of today . . . owe more in a physical sense to the . . . Kelts than to any other body of invaders (8)'. It is the Celtic element which serves to give the British racial amalgam its unity, while the earlier and later elements serve to differentiate the island people from one another—Brünn folk in Ireland, Neolithic and Bronze-age folk and Vikings in Scotland, Anglo-Saxons and Danes in England, and Atlanto-Mediterraneans in Wales.

⁴ Shetelig, Falk and Gordon, *Scandinavian Archaeology* (Oxford, 1937), pp. 174 f.

⁵ It shares plurals in *-s* and superlatives in *-st-* with Indo-Iranian. As to garbling, the unusual consonantal mutations, and the large number of apparently non-Wiro words (such as *house, stone sea, wife*) may be cited.

⁶ Coon, p. 188.

⁷ Coon, p. 210.

⁸ p. 399.

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EVIDENCE OF EARLY PLOUGHING FROM HOLLAND

In the March number of *ANTIQUITY* (1946, pp. 38-9) I drew attention to Prof. Hatt's war-time discoveries in Denmark of the marks left by ploughing in soil that was subsequently overlaid by datable accumulations of debris. In particular he re-interpreted Rosenberg's evidence of plough-marks which the latter had found beneath a Bronze Age barrow that goes back to at any rate the 14th century B.C. Now we have news of parallel discoveries made by Dr Van Giffen in Holland*, which confirm Hatt's conclusions and make a strong case for the use of the plough in Denmark and Holland several centuries earlier than the earliest evidence from England.

Three barrows near Zwaagdijk, close to the west shore of the Zuyder Zee, were examined by Dr Van Giffen in 1942. Unfortunately no grave-goods were found to date the barrows, but one had been surrounded by a timber circle and the other two each consisted of a primary mound overlaid by a secondary, each with its own ditch. On general grounds all three barrows in their earliest form are attributed to the Middle or Late Bronze Age, and under all three evidence of previous cultivation of the old land surface was found. Under the two primary barrows actual plough-marks were found crossing one another at right angles, as in the Danish examples, and analysis of the soil confirmed that it had been under cultivation. It is not stated that plough-marks were found under the ring-barrow, but only that the subsoil consisted of old arable. The dating here is too vague to be of much value, but Dr Van Giffen states that similar plough-marks had previously been found under a barrow near Gasteren, municipality of Anloo in Drente, dating from about 1600 B.C., thus pushing the date even further back than the Danish evidence does.

He also states that traces of cultivation by hoes, apparently consisting of antler-picks, have been found under a number of later barrows.

An interesting section on flint sickles draws attention to the rare examples of this implement from Holland, from which it would appear that judging by the distribution of gloss on the blades, the Dutch crescentic sickles occupy an intermediate position, as regards hafting, between the Scandinavian crescents and the British curved blades. This provides an important link in the development of the latter. E. CECIL CURWEN.

A BERMONDSEY COIN-HOARD, 5TH CENTURY

Julius Caesar invaded Britain in 55 and 54 B.C., but did not stay. Claudius conquered it in A.D. 44, and this time the stay was a prolonged one. Not until about A.D. 409—or, according to some authorities even later—were the Roman legions finally withdrawn. The departure of the Roman garrison spelt the separation of Britain from the Continent. The island lapsed into its own Dark Age, through which forms of native Britons and their tormentors, Picts, Scots and Saxons—a Vortigern, a Hengist and Horsa and a King Arthur vaguely loom. Historians try, without much conviction, to picture the state of Britain after the Romans left it, and archaeologists occasionally

* Dr A. E. Van Giffen, *Grafheuvelds to Zwaagdijk*, revised and enlarged offprint from *West Frieslands Oud en Nieuw*, xvii, 1944, pp. 121-243; English summary and numerous illustrations.

step in with some scrap of material evidence that seems to lend support to one or another view.

Archaeological evidence is obviously of the first importance, when it is possible to assign it a close date. As a rule it is almost impossible to draw a line in Britain between what was late Roman and what may have been post-Roman. It is the fact that we can confidently assign a post-Roman date of burial that gives importance to the little hoard of Roman bronze coins recently found in an earthenware pot during clearing of foundations in Bermondsey.

The coins themselves are pitiful little objects—in size something less than a three-penny bit—of poor metal, alloyed, it seems, with lead, nearly all worn, many of them worn smooth. Only occasionally can the name of a Roman Emperor be clearly read—as, for example, Theodosius the Great, or his sons, Arcadius and Honorius. It is the reverse types that help most, for enough usually remains to allow of an approximate date. Now of the 317 coins of this hoard nearly 90 per cent were struck between the years A.D. 380–400; the remainder were odd scraps of earlier coinage, often cut down from their original size. There was no mint at the time in Britain: the supply came mainly from Lyons and Arles in the South of Gaul (France.) It must have taken some few years for such a collection of coins even to reach Britain. A great many more years must be added for the coins to be worn down by circulation to the state in which they have been found today. One should further note that quite a number of the coins are not the original issues of Roman mints, but imitations—presumably made locally in Britain itself.

The hoard, then, tells a very clear story. Though soon after A.D. 400 supplies of coin from the Continent ceased to reach Britain, the existing stocks, consisting mainly of the insignificant pieces of the latest issues of the 4th century, continued to be used until they were worn out. As the originals wore out, they were replaced from time to time by local imitations. We must not magnify the significance of a single hoard of small objects, but, as far as it goes, it encourages us to think of London, as late perhaps as A.D. 450–475, as a place where people lived together and traded in the old style. Similar evidence will probably be available, if carefully looked for, in many other places. These late hoards of worn and unsightly coins have often escaped proper investigation because of their apparent unimportance. If such evidence is carefully recorded over a term of years, it may finally be possible to bring the Britain of King Arthur and the Saxon White Horse out of its legendary darkness into some faint, but not illusory, historical light.

H. MATTINGLEY.

MOUNT BADON—A TOPOGRAPHICAL CLUE?

St. Finnian of Clonard (it is necessary to distinguish him from his namesake of Moville, who lived until 578) died of the Yellow Plague in 549. In his youth he spent a considerable period ('thirty years' according to his *Vita*) as a student in various South Welsh monasteries. He appears in the Book of Llandaff as *Finnian Scottus*. His return to Ireland took place not long before or after 520. His final adventure in Britain is recorded with admirable but somewhat overdone terseness by his much later Irish biographer (1):

¹ *Lives of Saints from the Book of Lismore*, edited by Whitley Stokes, pp. 223–4. *Anecdota Oxoniensia*, Oxford, 1890. I have not been able to consult the Latin version, in the *Codex Salmanticensis*. A similar story attached to St. Aidan (Rees' *Cambro-British SS.*, p. 237) appears to be a case of literary borrowing.

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' Once upon a time Saxons came to ravage the Britons. They pitched a camp (*longphort*) on the side of a lofty mountain. The Britons betook themselves to Findian to ask a truce for them from the Saxons. Findian went on the service. The Saxons gave him a refusal. Findian gave a blow of his staff on the mountain, so that the mountain fell on the Saxons, and not a man of them escaped to tell the tale '.

Brief as it is, the account presents several notable points.

(a) The Saxons were aggressors—they had not yet been checked. This negatives the idea that the episode took place after the battle of Mount Badon (*Mons Badonicus*).

(b) Since Finnian's British habitat was South Wales, and the Saxons almost certainly came from the East, the 'lofty mountain' should be looked for in the vicinity of the Lower Severn (cp. the Gildasian gloss *prope Sabrinum ostium*, referring to Badon).

(c) *Longphort* usually implies a fortified position, not simply a resting-place. In this case it suggests the utilization of a pre-existing earthwork.

(d) But the 'camp' was on the side, *not* the top of the hill. It was a plateau fort (cp. Geoffrey's account of the Saxons retiring *uphill*) (2).

(e) An attempt at negotiation between the opposing forces (cp. the embassies between Arthur and Osla Great Knife—the latter apparently encamped at Badon—in the Welsh tale, 'The Dream of Rohnabwy' (3)).

(f) The episode ends in overwhelming disaster to the defenders of the hill (cp. Gildas' *non minimae strages*) (4).

This suggests, first, that Finnian was present at the siege of the Badonic Mount, perhaps like the monks of Bangor a century later, to pray for a Christian victory, and told the tale of it to his monks at Clonard, and, secondly, that we have in this description a clue which, in the proper hands (*not* the writer's) might lead to a definite identification.

If this is correct, we should search the region around the Lower Severn (the *eastern* side of the river seems much the more likely, but the western shore should not be arbitrarily ignored) for a lofty hill with some sort of entrenchment on a plateau, with a steep escarpment above and below it. These features are so distinctive that they should be recognizable, and so rare that only a very few sites are likely to be able to contend for the honour.

P. K. JOHNSTONE.

CONSERVATION OF ARCHITECTURAL MONUMENTS, U.S.S.R.

Early in its existence the Soviet government was confronted with a number of new problems relative to the conservation of cultural treasures in the country. Many architectural monuments had suffered damage in the course of the Civil War, others (mansions, estates and palaces) had been abandoned by their owners and required investigation, protection and restoration.

One of the first measures taken by the Soviet government in this direction was the establishment, on the initiative of V. Lenin, of a commission for the restoration of the historical structures in the Moscow Kremlin. The members of this commission included leading specialists in art and in restoration work (I. Grabar, Rytsky, Sukhov, and others). A similar commission was set up in Petrograd (now Leningrad) and later in other republican and regional centres. All these organizations were charged the task of assuming state control and protection over monuments of art and antiquity. They functioned under the Department of Museums and Preservation of Monuments which

² H.R.B., IX, 4.

³ Guest's *Mabinogion* (Everyman), pp. 141, 148-9.

⁴ *De Excidio*, c. 26.

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was set up in 1918 under the People's Commissariat of Education. At the same time (5 October 1918) the Soviet government issued a decree for the preservation of historical art treasures. In event of neglect on the part of the owners of such art treasures or of their inability to protect these treasures, the decree provided for the confiscation of such property. The All-Russian Commission on Restoration of Art Treasures, which functioned under the People's Commissariat of Education of the R.S.F.S.R. from 1918 to 1924 and which has been known as the Central State Restoration Studios since 1924, effected the registration and investigation of old buildings, paintings, sculpture, decorative and applied art, through local authorities and through special expeditions working under its auspices. The Central Repair Studios which existed until 1935 and were re-established in their former form in 1944, were divided into sections and special groups headed by a scientific council (secretary—Academician I. Grabar). (1) restoration of architectural monuments (working in close contact with sections for registration of monuments); (2) restoration of paintings (divided into departments of ancient Russian ikon painting and modern oil painting); (3) restoration of antique textiles and embroidery. These studios were equipped with physico-chemical laboratories and X-ray installations. Special field expeditions staffed by specialists in art and architecture were sent to restore monuments outside Moscow. Restoration studios have been opened in places where there are many ancient monuments requiring restoration, at the Sergievo-Troitsky Abbey in Zagorsk, in Yaroslavl, etc.

Uniform principles for restoration work were elaborated at conferences in which leading specialists in this field took part. These called for a careful preliminary study of the monument, an exact description of its state at the moment of restoration, the use of only verified means of restoration, the use of the same material as the original in restoration work, recording of all stages of the restoration process either in photographs or in writing, the rejection of the practice of filling in damaged portions (this is admissible only when absolutely necessary for the preservation of the monument).

By means of special research by 15 expeditions up to 1935, and by questionnaires filled in by local authorities, a total of nearly 6,000 objects of historical and architectural significance were registered. Of these about 3,000 required state protection. The most valuable (1,300) were placed under the observation of central government organs and the remainder under the observation of local organizations. In event of the necessity of repairing or restoring a building in either of these groups, the problem was first discussed at a meeting of specialists who gave their opinions as to the state of the building, and of restoration. Altogether about 500 meetings were held. A number of results based on these projects were published in a two-volume symposium called 'Problems of Restoration'.

This was the method followed in the restoration of the old buildings in the Moscow Kremlin from 1918 to 1923. At the suggestion of V. Lenin repair and restoration studios were set up under the supervision of architect Rylsky. The 18th and 19th century portals of the Archangelsky cathedral (1509) and the palace church, which spoiled the integrity of the architectural scheme, were removed. The arcades of the Patriarchal church of the Twelve Apostles (1650) were also restored. The wall erected in the 19th century near the Ivan Great Belfry (1600) was taken down. The arches in the famous church of Vasily Blazhenny, erected on Red Square by Ivan the Terrible in 1556-1560, were taken down and the original pillars of the gallery encircling the building were restored. The fresco ornamentation of the 17th century was restored. The Sergievo-Troitsky abbey in Zagorsk, a priceless example of the first quarter of the 15th century, has been greatly disfigured by later additions, re-plastering and re-painting. The

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northern façade of the cathedral has now been entirely restored to its original appearance. The ikons by Andrei Rublev, famous Russian artist, were restored in the interior of the cathedral under the supervision of Academician Igor Grabar. The stored iconostas is a marvellous example of 15th century painting in its harmony of line and colour.

The belfry of the Voznesenia church in Kolomenskoye near Moscow was restored under the supervision of architect Baranovsky.

Similar restoration work is being carried on in Yaroslavl, Uglich, Kiev, Chernigov and other Russian cities. In Vladimir, for instance, a whole system of supporting structures was erected with the most painstaking care to reinforce the building which had fallen into disrepair.

The paintings and sculptural ornaments in these buildings are restored at the same time as the exterior. During the restoration of the churches of Spaso-Preobrazhenia, Mirozhsky and Snetogorsk in Novgorod, for instance, specialists uncovered beautiful frescoes by Theophanes, the Greek, dating back to the 14th century. Mural paintings by Andrei Rublev, dating to the 15th century were uncovered in the Uspensky cathedral in Vladimir, etc.

Restoration work is proceeding on an equally large scale in other republics of the Soviet Union. Urgent repairs were made of all the historically significant buildings in Samara, Bokhara, Khiva and other places. The dome of the portal in the Shir-dor Medres in Samarkand was re-laid, the unique mosaic in the tympan of the arch was reinforced and the partially defaced decorative braid replaced along the edge of the arch.

Work on the straightening of the minaret of the Ulug-bek Medres, also in Samarkand, presents some very interesting aspects. Under the influence of seismic disturbances, this building began to sag and threatened to collapse. By means of very complicated and painstaking investigations engineers succeeded in determining the original positions of the axis in space and establishing all the deviations which had taken place since the building was first erected. The frame of the minaret was secured by cables and the whole superstructure of the minaret enclosed in a concrete casing after which work was begun on straightening the minaret by means of specially constructed machines. The process took several years but gave splendid results. The minaret has now been restored to its original appearance and rests on a strong earthquake-proof foundation.

Many ancient buildings in Bokhara have also undergone restoration. One of them is the mausoleum of the Samanides (10th century) the constructive and decorative parts of which have been completely restored. In Uzgen the ancient capital of the Karakhides (Kirghizia), the cupolas and portals of the 12th century mausoleums, noted for the superb mastery of their decorative details, have been restored.

Supervision of the restoration of architectural monuments was exercised by the Academy of Architecture where a special commission on the preservation and restoration of architectural monuments was set up in 1940. This commission investigated and verified the list of monuments to be preserved, drew up measures for their preservation, carried out work in recording the exact state of these buildings both in the form of drawings and in written descriptions, assisted local authorities and in the more important cases directly supervised restoration work.

One of the most significant phases of the Commission's work was that of including architectural monuments in the ensemble of cities undergoing reconstruction. In Moscow, for instance, the Commission began architectural-archaeological investigations of the Zaradya district in 1940 and also began drawing up plans for an open-air U.S.S.R. Museum of Architecture in the village of Kolomenskoye. Both these projects were cut short by the beginning of the war.

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Beginning with 1942, members of the Commission made trips of inspection to regions liberated from the Germans where they examined monuments, drew up affidavits, took photographs and, when necessary, measurements. In 1942 and 1943 the Commission sponsored twenty such expeditions and investigated approximately two hundred and fifty monuments.

By decision of the Council of People's Commissars a Commission on the Preservation of Monuments was instituted under the Committee on Arts in 1942. This Commission continued the work of investigation and restoration. In addition, it compiled special illuminated maps of cities and regions containing important monuments and works of arts. This was done in co-operation with the Red Army Command. Advancing army units were guided by these maps in correcting their artillery fire and thus spared places designated as sites of important historical monuments. After a city was liberated such places were the first to be investigated for fires or mines since the German vandals wantonly set fire to all they could in retreating.

At the present time these maps are a valuable aid to architects in investigating liberated cities. They are also used by designing and planning organizations in drawing up blueprints for the restoration of cities which suffered from the German invasion.

As part of the general work being carried on to determine the extent of destruction and damage inflicted by the Nazi invaders, the Commission investigated a number of liberated cities (Novgorod, Smolensk, Pskov, Vyazma, Kharkov, Kalinin, Kiev, Mtsensk, Voronezh, etc.). It also worked out methods for the temporary reinforcing of damaged monuments and at the same time compiled new lists of monuments to be preserved under state control. The new figures reach a total of seven thousand—one thousand more than the pre-war figure.

Plans have been drawn up by prominent specialists for the restoration of the ancient buildings of Novgorod and Smolensk. The 1945 budget of the R.S.F.S.R. provides for allotments of two million rubles for the restoration of the Novgorod Kremlin, one and a half million for the restoration of buildings in Pskov and the same amount for work in Smolensk. Palaces and other buildings in Peterhof, Pavlovsk, Pushkin, Istra, and Pskov which were barbarously destroyed by the Germans are also to be restored. Some of these buildings, however, are damaged beyond repair. In Novgorod, for instance, the 12th century Spaso-Nereditsa cathedral with its superb frescoes, the Church of Uspenya na Volotov Polé and many others were reduced to ruins.

The All-Union Archaeological Conference called by the U.S.S.R. Academy of Sciences in Moscow in the spring of 1945 discussed as one of the main items of rehabilitation work and new legislation on the preservation of historical monuments in the Soviet Union. In view of the tremendous scale of such work in the liberated regions and the many new scientific and technical problems which have arisen, this work will be too great for the present Commission and Restoration Studios to handle. The Conference therefore decided to establish a centre at the U.S.S.R. Academy of Sciences which will consolidate all the work of archaeologists, art specialists and restoration artists, and give them extensive rights and material opportunities for restoring and preserving historical monuments of culture and art in the Soviet Union.

PROF. SERGEI TOROPOV.

Reviews

ITALIAN JOURNEY. By G. BLAKE PALMER. Auckland, New Zealand. Oswald Sealy (N.Z.), 1945. pp. 239. *Frontispiece and 6 plates.*

This book is largely based on talks and pamphlets prepared by Major Blake Palmer for the Educational Service of the 2nd New Zealand Expeditionary Force in order to give some information to the troops on the historical background of those areas in Italy through which the New Zealand Division had passed. The treatment is naturally popular and anecdotal and Major Blake Palmer's comments on famous sites and cities from Tuscany to Apulia provide much miscellaneous information in the guide-book manner, often curiously juxtaposed, as when we are told that 'Up on the hill at Ravello's Castel Rufolo Wagner was inspired for the music of Parsifal and at one of those many villas Greta Garbo passed her honeymoon'.

Typographical errors and verbal inaccuracies abound—'the Cloachan Maxima' (p. 112), 'the plebs frumentarii' (p. 98), 'the cura annonae' (p. 98), 'the Aedes Vesta' (p. 111), 'the barbarian inroads' (p. 118), 'the votaries of Dionysius' (p. 121).

In matters of historical detail Major Blake Palmer is very casual. 'In 48 B.C.', he writes, 'Caesar overthrew Pompey at Pharsala (*sic* !), in Greece, and on the 15th March, 44 B.C., he fell to a conspiracy the details of which are familiar to all Shakespeareans'. His general judgments are of the same order. In his brief paragraphs on Republican Rome we are told that 'Literature was scanty and largely epigraphical and the fear of emotional writing combined with the Latin love of the hidden verb makes it terse and uninteresting to moderns'.

The book has no claim to be regarded as a work of scholarship, but Major Blake Palmer's personal observations and his descriptions of the 'Apulian countryside are often lively and entertaining and will doubtless be read with pleasure by many of those who took part in the Italian campaign with the New Zealand Expeditionary Force.

G. F. FORSEY.

ROMANDICHTUNG UND MYTHOLOGIE: EIN BRIEFWECHSEL [von KARL KERÉNYI] mit THOMAS MANN. (*Albae Vigiliae, Neue Folge, Heft 2*). pp. 95. Rhein-Verlag, Zurich, 1945.

This interesting correspondence between the well-known author and the Hungarian classical philologist specialising in the history of religion, was published by the latter in Zurich, where he lives in exile. Readers of Thomas Mann's Joseph tetralogy will have been intrigued by the mythology that pervades the fine and important work in all its parts, from beginning to end. The mythological note is struck with the very first words of the prelude (Descent to Hell): 'Deep is the well of the past. Must we not call it unfathomable'? Not only does Thomas Mann attempt to explore the depths of the well of the past, he also seeks to establish relationships of a mythological character between myths and myths, peoples and peoples, past and present, and lastly between all these things and his own thought. 'The very word relationship', he says, 'has fascinated me for a long time, and what it stands for plays a significant part in my thought and artistic doings'. It is here that these two minds meet, that of the artist and that of the classical scholar; for the tracing of relationships, the faculty and art of seeing distant things as related, is the characteristic feature that distinguishes Kerényi from many of

his colleagues. He finds confirmation for this tendency in the great novelist's 'seeing-together' of significant historical or mythological traditions and general human experience, and the novelist in turn stresses how much stimulation he owes to the various essays, books and writings Kerényi sends him, as well as to their exchange of views in this correspondence. He confesses that the mythological interest has stirred within him late in life, and calls his Joseph-novel 'this strange novelistic enterprise'. With a feeling almost of bewilderment he sees his interest move away from the field of bourgeois individualism to that of a more typical, more generically human world. Kerényi is less surprised by this turn; he sees analogous tendencies in writers like D. H. Lawrence, Aldous Huxley, and J. C. Powys, and as author of 'Die griechisch-orientalische Romanliteratur in religionsgeschichtlicher Beleuchtung' (Tübingen 1927), he perceives connecting links with this remote literature almost unknown to the German writer. We note with interest that Thomas Mann uses, 'shamelessly', as he confesses, some of the material supplied by Kerényi in episodes of his novel such as the chapter 'The Bitch' in 'Joseph in Aegypten', where Potiphar's wife turns to black magic. There are many illuminating passages, in the correspondence, about the ever-recurring theme of mythology and the art of the novel; Kerényi finds more comprehension of his aims as a scholar in the artist Thomas Mann than in the circle of his colleagues, and the author in turn states that 'their intellectual intercourse has engendered a kind of mutual work on a philosophy of mythology'.

H. W. BELMORE.

DATING THE PAST: an introduction to Geochronology. By FREDERICK E. ZEUNER. pp. 444, 24 half tone plates and 103 diagrams. Methuen. 30s.

One of the first reactions to any new Prehistoric find is to ask its age as reckoned by man's time scale. The difficulty of obtaining even a reasonable guess as to the answer gave rise to the school of thought which stated firmly that it was not the business of archaeologists to concern themselves with actual dates, but that they should confine their attention to relative dating. This method of dating is a colourless thing for the layman and it fails to stimulate his imagination. Only too often has it stifled the imagination and vision of the archaeologist and for this reason, if for no other, one must welcome *Dating the Past* as a most exciting and stimulating book.

During the past half-century man has been developing new techniques in his efforts to answer the question, 'How old is it?' and all these methods are described by Dr Zeuner in this book. Towards the end of the last century De Geer began his work of analysing the 'varved' or laminated clays which were laid down as ice sheet retreated. In the early years of this century Douglas began to work on Dendrochronology, based on an analysis of the annual growth rings of trees. Today we have many new techniques. Pollen analysis of peats helps to tie up deposits with various climatic phases of the post glacial period, which have been dated by varved clays. Climatic changes during the Pleistocene period, that is, the succession of glacial and interglacial periods, are studied in relationship to the fluctuations of Solar Radiations due to the periodic perturbations of the earth's orbit. This technique provides a time-scale back to a million years ago. Yet another technique, based on a study of the disintegration of radio-active minerals, provides a time-scale of 1500 million years, dating the history of the earth and of life before the arrival of man.

Dr Zeuner has the gift of clear statement and in spite of the very specialized nature of the subjects, his chapters on the effects of the fluctuation of Solar Radiation and the method of dating rocks by the radio activity technique, can be understood by the layman. The book contains a first-class bibliography and an excellent index. The diagrams are

well chosen, but the key to the various conventions employed in them is not always complete, though it can be re-constructed after a little thought. For example, in figs. 16-19, the line which shows what can only be the limit of the ice sheet, is not described as such. The plates are often disappointing; the subject matter is excellent but either the original photographs or else the blocks made from them, are not always as good as they might be.

These minor imperfections must not be magnified out of proportion and obscure the fact that this is a most important book and one that all archaeologists should buy. Museum curators will find it of great value, for their visitors are always, and very properly, wanting to know the age of the museum exhibits. In the past, curators have had to make some rather wild guesses and there was one local museum, arranged by a well known antiquary at the beginning of this century, whose flint implements from the 100 feet Thames gravels, were actually labelled as being 'not more than 4000 years old'. This attempt at dating was based on a too literal interpretation of the Old Testament, and the importance of Dr Zeuner's book lies in the fact that he gives a clear and full account of the evidence which has lifted the question of dating prehistory above the level of speculation, and has placed it on a proper scientific footing. N. COOK.

THE USE OF HISTORY. By A. L. ROWSE. *Hodder and Stoughton*, 1946. pp. 248. 4s 6d.

This is an excellent statement of the reasons why history should be studied; it is impossible, without a knowledge of history, to understand the world of today, or to enjoy life to the full. With these opinions the reviewer is in complete agreement, not least because he has been saying the same thing himself for many years. But having, through history, reached that understanding of the present, most of us turn hastily back to the past as a more pleasant subject of contemplation, and the ideal one for an escapist. (For the best results one recommends remote periods and lands 'of which we know but little').

Fresh rationalisations are required in each generation for the pursuit of pure knowledge. Nearly a century and a half ago the reasons adduced were that such studies* illustrated the principles of revealed religion and tended (incidentally) to advance 'our political interests in India'. Students will no doubt continue to find good reasons for following their bent. It was not, however, for any such reasons that Gibbon wrote his masterpiece.

As a guide and help for those anxious to take up history the book will be found useful and the practical hints are admirable.

The author makes a good point (p. 212) in saying that 'much of historical writing is itself good literature'. One might complement this by saying that much of modern 'literature' is bad writing. The works of such historians as Stenton, Trevelyan, Macdonald and Haverfield, are to be read with an aesthetic pleasure which is quite independent of their content. 'The great historians are great writers as much as the poets and novelists'. Some of the best modern fiction, for example 'Darkness at Noon', is concerned with problems which are fundamentally historical; and some of the best modern journalism, such as 'The Narrow Street', is really a study of local history (or sociology) in the modern tense.

The book is the first of a series designed to teach history by means of the biography of 'the great figures of history' (p. 46). There is much to be said for the method,

* Actually, oriental literature; but the examples quoted were nearly all historical works; see Bruce's *Travels*, 1805, VII, 417-8.

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for the prime need is to arouse interest, and biography can do this. If interest is not aroused, nothing will be learnt. In the great argument, whether history is made by great men or geography, we have always adopted a middle position, holding that it is made by both—by the interaction of man and his environment. There is, therefore, a risk that this series may over-emphasize one factor. To redress the balance, perhaps another series might be produced, on similar lines, emphasizing the role played in history by, for example, great rivers (the Euphrates, Nile and Indus), mountains and passes, islands, estuaries and such-like. Contrast, for example, the part played in history by the Bosphorus and the Dardanelles with that of the Suez Canal. Mr Rowse, though obviously a map-lover himself, has curiously little to say of the fascination of map-study and its use in history—perhaps because he is, for the moment, concentrating his attention on the biographical side.

There are, naturally, minor points with which one disagrees. Surely Dr Johnson was as unlike Socrates as any man could be? Socrates felt he had a mission, to make people think, and was always asking them questions with this aim in view. Dr Johnson, however, always appears as the questioned; he was pontifical (which Socrates never was) and far too urbane to have a mission. On the really fundamental problems of existence he seems to have been strangely undecided, whereas Socrates felt sure of himself.

The tag from the Latin Grammar, referred to on pp. 21-2, speaks of expelling not history but nature.

Mr Rowse criticizes Collingwood but underrates him, and once (p. 148) lapses into unpardonable flippancy. Collingwood was an original thinker of the first rank. He was a philosopher who debunked philosophy, and if only for that we owe him a great debt. If some of his ideas were derived from Croce, he was for all that a thinker in his own right as well. Unlike most philosophers he was master of an art—archaeology, and could speak with authority on that subject—which is of course a historical one, in the wider sense. He was a pupil of a great professor of history, and like him has left a permanent mark on the university, to which in turn both owed so much. The emergence of Oxford from the 'pre-historic' period may not have been due to Collingwood, but he was himself mixed up in the process.

O.G.S.C.

HERMES DER SEELENFÜHRER. By KARL KERÉNYI. (*Albae Vigiliae, Neue Folge, Heft 1*). Rhein-Verlag, Zurich, 1944.

In another (see p. 164) '*Albae Vigiliae*' publication, '*Hermes der Seelenführer*', we catch a glimpse of what is meant by this 'study of great mythology' so often alluded to in Kerényi's letters to Thomas Mann, where he asks: 'How is it that well trained philologists are capable of not perceiving what is contained in the very texts they study?' Nietzsche was a classical scholar with vision; Kerényi walks in his footsteps, but while only few of Nietzsche's works are based on classical research, all of Kerényi's writings have that foundation. He distinguishes between extensive and intensive scholarship; 'as long as we are gathering material and searching', he says, 'we are extensive; as soon as we start 'finding' something, we are compelled to become intensive'. The finest example of such work is perhaps Kerényi's study on Apollo (Amsterdam-Leipzig 1941); but also this more casual essay on Hermes may serve as an example of his intensive work, based on research plus intuition, which recreates a living vision from the sum total of the established material. Starting from the question: 'What was it that appeared to the Greeks under the name of Hermes?' we are made to visualise the ancient Hermes-world, originating in a prehistoric ram-deity, embracing Hermes the thief,

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the divine messenger, the adventurer and boldly loving male, and Hermes psychopompos, the mediator between the upper and the nether world ; relationships are established and connexions seen between the god and night, love, manliness, the world of the living and that of the dead. The scholar must become a seer, almost a poet, in order to see together, in a visionary synthesis, and evoke for us, from many individual traits and scattered observations, not only the god, but also the world in which he moves and that belongs to him.

H. W. BELMORE.

LONDON MUSEUM CATALOGUES, No. 7. MEDIEVAL CATALOGUE.

Lancaster House, St. James, S.W.1. pp. 319, 96 plates, 90 figs. Paper covers, 10s. Bound, 10s. 6d.

This is not a review, but a eulogy, for one can find nothing but praise for this fine catalogue. It contains precisely the kind of information required to enable one to date, with some accuracy, the small finds of medieval date, which are of frequent occurrence from most excavations which have a long history of occupation. It is just the book for which most museum workers have longed, for it contains dated classifications of many small domestic objects. The evidence for dating is set out in diagrams giving clear drawings of examples from dated medieval sites or manuscripts, so if evidence for dating is somewhat thin, the reader can forage for himself the order of accuracy he may expect from the chronology which is given.

The type, diagrams and plates are excellent and the book is amazingly cheap in price. What more can one say but 'thank you'.

N. COOK.

PSEUDO-IMPLEMENTS FROM THE GLACIAL CONGLOMERATES AT NOOITGEDACHT, DIST. KIMBERLEY. By HENRI BREUIL (read 3rd July, 1944) : *South African Journal of Science*, vol. XLI, pp. 397-9 (February, 1945).

It is worth calling attention to this short note, which might otherwise be overlooked, for it bears upon the evidence by means of which the Antiquity of Man is judged, namely, primitive stone implements. Those who have never accepted 'eoliths' as being of human origin have regarded as causal the close connexion between 'eoliths' and the works of glaciers—in other words, the moving ice made them. But it was seldom possible to prove the case up to the hilt, because man existed, or might have existed, at any stage in the last glacial epoch. Fortunately there were other earlier glacial epochs, one of them in what is now South Africa. This occurred during the Carboniferous period when the coal was being formed in Europe, and not the hardest champion of man's antiquity would claim that he existed then. Professor Breuil illustrated a pseudo-handaxe, a triangular flat pebble and a flake with a bulb and 'secondary' chipping round the edge. The 'handaxe' is more or less of a freak, but millions of similar flakes (also with glacial striations) may be found in the glacial gravels and moraines of this island. Their discovery in another glacial deposit so far removed in time and space from ours must surely convince all those whose minds are open to reason that 'eoliths' can be produced by natural forces and cannot therefore be used as evidence for the existence of man.

O.G.S.C.